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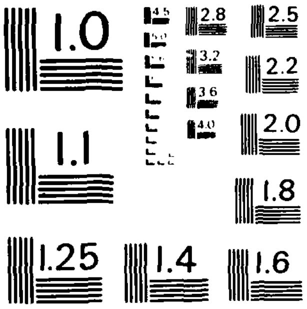
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AVIATION OFFICER REQUIREMENTS STUDY

PHASE II: FINAL REPORT

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AVIATION OFFICER REQUIREMENTS STUDY

PHASE II: FINAL REPORT

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August 31, 1983

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A model is presented which develops Aviation Officer Requirements at the sub-community level within the constraints imposed by a network of permissible career paths specified by the user. The model is currently implemented in a WANG 2200 VS computer in a "User-Friendly" interactive mode. The user can quickly make multiple runs, varying a number of parameters, to test the implications of various policy alternatives on Aviation Officer Requirements. Demonstration of model application and a model user's guide are included.

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I. INTRODUCTION

In spite of recent recruiting and retention success, Navy manpower managers face an increasingly difficult task in the next decade. A recovering economy will demand a greater share of the labor force. Demand will be particularly strong for personnel in those high technology skills which the Navy has the most difficulty in retaining. At the same time, the expansion of the fleet will require significant additional skilled manpower. The Navy's training establishment will be forced to expand to accommodate a larger Navy, and this will require additional increments of skilled manpower to staff the school system. Add to these considerations the decline in the 18-24 year old age group from which the Navy draws most new accessions, and the dimensions of the problem become apparent. It seems clear that frequent shortages of skilled manpower are likely to occur; that the cost of obtaining and retaining personnel is likely to rise; and that the process of Planning, Programming, and Budgeting for military manpower requirements and the management of the resulting inventory will be more complex and difficult than at any time in the past.

No group better exemplifies the scope of the problems identified above than Aviation Officers. Naval Aviator and Naval Flight Officer (NFO) retention is up. In addition to general economic conditions, the competitive effects of airline deregulation have had a direct impact on job opportunities for pilots. Airline mergers and a number of airline failures have inflated the rolls of furloughed pilots and created uncertainty regarding the degree of job security attached to a career as an airline pilot. In addition, a substantial Aviation Officer bonus has served as a positive inducement to young officers to remain in the Navy.

The improvements in Aviation Officer retention could not have come at a more fortuitous time. The force level expansion implied by a 600-ship Navy and the proliferation of ship types capable of supporting aircraft demand substantial increases in the number of Aviation Officers. At the same time, the large budget increments required to procure additional hardware and support for the expanded fleet militate against the added procurement required to replace and modernize an ageing training plant. In addition, recent increases in energy and manpower costs have dramatically raised the overall cost of providing Aviation Officers for the fleet. High retention reduces the number of new accessions required to replace officers who would otherwise leave the Navy. This, in turn, reduces training costs, relieving some of the fiscal stresses accompanying the force level expansion.

The benefits realized from the current high retention of Aviation Officers are not without a long term price. While force level expansion can be supported without any significant increase in training rates, the long term effect of this strategy is to distort the Aviation Officer inventory. In effect, relatively senior lieutenants (5-7 years of service) are being substituted for new accessions. In relative terms, a "hump" is being created at the senior lieutenant level, and a corresponding valley is being created in the more junior years of experience. While this distortion can be easily accommodated at the lieutenant level, it can be predicted that significant personnel management problems will arise as the inventory ages. As the hump and the following valley move through the senior command years, there first will be a surplus of officers eligible to fill senior positions, followed about five years later by a deficit.

In addition to the long term impact cited above, it should be recognized that current high levels of retention are unlikely to be sustained. As the economy improves, airline demand for pilots will revive. The revival is likely to be particularly robust as large numbers of senior pilots who entered airline service in the early 1950s reach mandatory retirement age. Thus the "valley" behind the current retention hump is likely to be deep--the result of low accessions compounded by low retention.

While the potential problems identified above are fundamentally personnel management issues, a great deal can be done to ameliorate the severity of their impact during the manpower planning process. Manpower planning defines requirements and identifies the course of action necessary to create an inventory to meet those requirements. Unfortunately, planners lack the analytic tools necessary to identify a preferred course of action. A large number of variables must be considered, the time available for manpower planning is short, and the number of planning iterations is likely to be large. The analytic procedures employed are rudimentary and are focused on near term requirements.

This report describes a more sophisticated tool that has been designed specifically to support the manpower planning process. In the following sections, the overall planning process will be described with particular emphasis on the difficulties faced by manpower planners. Following this, the general requirements for a manpower model suitable for the planning process will be identified. The specifics of the Aviation Officer Requirements Model will then be presented. Finally, the utility of the model will be demonstrated by presenting the results of a number of typical applications.

II. BACKGROUND - THE PLANNING PROCESS

It is logical to begin this discussion with a brief review of the essential elements of the planning process by which military manpower requirements in general, and Aviation Officer requirements in particular, are met. As with all resource requirements, manpower planning takes place within the context of the Defense Planning Programming and Budgeting System (PPBS). The fundamental objective of the PPBS is to produce the Five Year Defense Plan (FYDP), which is the basis for the resource requests for the Department of Defense contained in the President's annual budget submission to the Congress.

The PPBS process begins approximately 27 months prior to the beginning of the fiscal year corresponding to the first year of the FYDP which is the planning objective. (In the case of manpower, the first year is the only year actually authorized and funded.) Force levels drive manpower requirements. Therefore, manpower planners must constantly revise their plans in response to changes in force structure and adjustments to weapon system acquisition schedules. Such changes and adjustments are frequent during the planning process within DOD. In the subsequent authorization and appropriation process before the Congress, further changes occur. Ideally, the Military Personnel-Navy (MPN) Authorization and Budget should exactly support the fleet and shore establishment authorized by the Congress; that is, provision should be made for the skills and grade levels required to man and support the fleet. In reality, the result is only an approximation of requirements.

Manpower planners face a number of difficulties in establishing manpower requirements in the dynamic environment of the PPBS. Among these are the following:

- The need to adjust requirements to constantly changing force level decisions. This includes the adjustment of direct requirements and such indirect requirements as training staff, student billets, and other indirect support personnel. In addition, adjustments must be made within an overall end strength constraint.

- The need to adjust certain requirements to meet current personnel deficiencies. To the extent that current inventories fail to meet skill and grade level requirements, recruiting and training manpower resources must be provided to acquire and train additional increments of personnel.

- The requirement to manage three different budgets simultaneously. Because of the long planning lead time, manpower managers are constantly concerned with execution of the budget for the current fiscal year, defending the budget for the next fiscal year during the congressional budget process, and developing the budget for the following year. These three budgets are not independent of one another. In general changes in one mandate changes to the other two.

- The fact that the personnel inventory is created and sustained by accessions at the lowest skill and experience levels. This means that changes in manpower requirements at any skill or experience level must ultimately be reflected in accession requirements. Consequently, almost any change in manpower requirements can have a significant impact on a broad range of manpower and personnel management issues: promotion planning, skill conversion policy, specialized training requirements, and manning priorities, to name a few.

- The existence of significant uncertainty regarding the future state of personnel inventories. Direct manpower requirements are established by force levels. However, incremental requirements at a point in the future are a function of the difference between overall manpower requirements and the personnel inventory that will result from the ageing of the current inventory. The inventory ageing process is influenced by both endogenous factors associated with personnel management actions and exogenous factors relating to political, social, and economic forces operating at national and international levels. The determination of the impact of these factors on the parameters that describe the inventory ageing process--retention, attrition, and retirements--is an art, not a science.

In the face of the difficulties described above, the manpower planner necessarily has a multiplicity of planning objectives. These can be categorized in terms of the planning horizon in which they are operative:

- In the short term, defined by the planning process itself, the planner must meet requirements. This may mean reducing requirements or reallocating resources among competiting claimants. In general, the process is reactive, responding to real-time crises associated with the current fiscal year budget, or short-fused threats to near-term fiscal year budgets which are constantly being raised in the Defense bureaucracy or in the Congress.

- In the intermediate term, defined by the later years in the FYDP, the planner should adjust requirements statements to reflect the realities of the current budget cycle and changing conditions in the personnel inventory and the external environment. As it becomes clear that current trends in force levels, personnel retention, or general economic conditions differ from initial planning assumptions, adjustments to the outyears of the FYDP should be made.
- In the longer term, beyond the FYDP, the planner should be aware of the long term impact of his decisions. Personnel acquired today in response to changing requirements will be in the Navy well beyond the FYDP timeframe. The expected service life of an Aviation Officer is about 10 years, and significant numbers remain for 30 years.

The most severe personnel management problems involving Aviation Officers today are concerned with surpluses or shortages of personnel with between 12 and 16 years of service. The accessions that established these inventory year groups occurred between 1968 and 1972. Since that time, force level changes, added missions, and variations in Aviation Officer retention have combined to create severe mismatches in several subcommunities between LCDR/CDR requirements and the inventory of officers available to fill these requirements. While such mismatches could probably not be avoided altogether, there were alternative accession plans available in 1968-1972 that would have significantly reduced the magnitude of current problems. Unfortunately, the manpower planner has very little time to devote to analysis of the long term impact of his decision within the context of the PPBS. The analytic tools available do not permit any extended assessment of these impacts.

The planner must obviously meet immediate requirements. Therefore, the short term planning objectives dominate the planning process. Given a mismatch between inventory and requirements, the manpower planner must increment or decrement accessions even if the mismatches occur in senior grades. In effect, he seeks quantitative balance under the implicit assumption that qualitative matches will be made through application of appropriate training and/or personnel management policies. There are two major problems that can arise under this approach:

- Resources required to implement future changes in training or personnel management policies are left undefined. There is no assurance that they will be provided.
- Personnel management policies affect retention. To the extent that they are perceived to be inimical to the individual's career objectives, retention can be expected to decline. Thus, the manpower planner can heavily influence one of the principal variables affecting the inventory projections used in the planning process. However, these effects are difficult to exploit in the planning process because they lie beyond the immediate planning horizon.

While the focus of manpower planners on immediate requirements is unavoidable, it is reasonable to suggest that a significant consideration in selecting among competing short term courses of action would be the assessment of the long term impacts of those courses of action. Unfortunately, such assessments are difficult with currently available planning tools. What is needed is a simple planning model that does the following:

- Establishes the long term context of requirements determination as an inventory building process. The ultimate objective is to achieve the "proper" match of inventory with stated requirements.
- Accounts for personnel management policies that constrain the application of inventory to requirements; that is, the model must go beyond simple quantitive measures of inventory and address qualitative factors such as skill and experience levels.
- Incorporates a consistent set of the variables and parameters used to describe both requirements and inventory. While the user may be primarily concerned with a few variables in the set, he needs the assurance that manipulation of these variables occurs in a context which maintains consistency over the entire set.
- Permits rapid iteration to permit evaluation of alternative strategies and parametric analysis of the impact of key variables such as retention.

- Provides outputs which identify requirements in terms of both skill and experience mix.
- Defines accession requirements to support the personnel inventory.

The Aviation Officer Requiremen Model, described in the following sections of this report, is a planning model intended for application in the determination of Aviation Officer requirements in the PPBS. It meets all of the above criteria.

III. MODEL DESCRIPTION

A. GENERAL DESCRIPTION

The Aviation Officer Requirements Model was described in a previous report[1] of this study. That description provided an exposition of the structure of the model, an analysis of model parameters, and a discussion of potential solution procedures. A computer program that implemented one solution procedure was also described.

The discussion which follows presents the model structure from a slightly different perspective in an effort to demonstrate how the criteria enumerated at the end of Section II are satisfied. In the interest of brevity, unnecessary repetition of material from the previous report is avoided. The reader who is interested in a detailed description of model parameters, their derivation, and the functional relationships among them should refer to that report.

In general, the Aviation Officer Requirements Model meets the effectiveness criteria proposed in Section I in three ways:

- Requirements Specification. Requirements are specified in a way that accounts for both the skill and experience level needed in billet incumbents.
- Inventory Specification. The inventory is defined in a way that is directly related to requirements. Accession levels and the inventory ageing process are specified.
- Personnel Management Policies. Personnel Management is the process by which inventory is matched to requirements. Policies imply rules for assigning officers. Rules imply constraints in the application of inventory to meet requirements. Thus an inventory which is numerically equal to requirements may not in fact meet requirements. The Aviation Officer Requirements model accounts for these constraints.

1/F.E. O'Connor, Aviation Officer Requirements Study, ISI Report No. V-2693-01, (Information Spectrum, Inc., Arlington, VA, 22202, 31 May 1982).

The implementation of each of these three facets of the Aviation Officer requirements model is discussed in detail below.

B. REQUIREMENTS SPECIFICATION

The concept of manpower requirements implies number, skill, and experience; that is, the Navy needs a certain number of Aviation Officers who can operate particular kinds of weapon systems, and--given that the level of proficiency will vary--experience criteria are specified. Thus the Navy might specify that it needs 50 Naval Aviators who are fighter pilots with at least 15 years of experience in order to provide commanding officers for fighter squadrons. Alternatively, the experience specification might require that the 50 Naval Aviators have reached the grade of Commander.

Aviation Officer Requirements are implicitly partitioned in at least three dimensions:

- By General Specialty - Naval Aviators or Naval Flight Officers. Naval Aviators are trained to pilot aircraft and control essential aircraft systems. Naval Flight Officers are trained to operate sensor systems, manage tactical display and analysis systems, and navigate the aircraft.

- By Generic Weapon System Type. A number of platform or system characteristics operate to require significantly different skills of weapon system operators. Specific missions also differ in training or experience requirements. Major differences in skill requirements exist for:

    - Fixed Wing vs. Rotary Wing Aircraft
    - Ship Based vs. Shore Based Aircraft

  Similar differences exist with respect to primary aircraft mission. Thus aircraft with an Anti-Submarine Warfare (ASW) mission differ from aircraft with an Anti-Air Warfare (AAW) mission in the demands placed on the Naval Aviators and Naval Flight Officers that operate them.

- By Grade Level. Three distinct levels of experience can be identified as required of Aviation Officers in Units which are responsible for the operation of aircraft. These levels can be classified by grade level:

Lieutenant and Below - The Operating Level
Lieutenant Commander - The Department Head Level
Commander - The Command Level

While this division is given in organizational administrative terms, the distinctions between the groups carry over to tactical supervision and training responsibilities.

The basic structure of the Aviation Officer Requirements model is established by partitioning the total Aviation Officer requirement along the lines outlined above. The resulting groupings are referred to as subcommunities. The current subcommunities residing within the Model are given in Table I.

TABLE I

AVIATION OFFICER SUBCOMMUNITIES

SUBCOMMUNITY (SYMBOL)	PRIMARY MISSION	CURRENT A/C TYPE	CURRENT SQUADRONS	INCLUDES	
				NA	NFO
Light Attack (VA)	AGW	A7/A18	24	X	-
Fighter (VF)	AAW	F4/F14/F18	24	X	X
Medium Attack (VAM)	AGW	A6	12	X	X
Air Early Warning (VAW)	AAW	E2C	12	X	X
Tactical Electronic Warfare (VAQ)	EW	EA6	9	X	X
Carrier Based (VS)	ASW	S3	11	X	X
Anti Sub Warfare Helicopter ASW (HS)	ASW	SH3/SH60	11	X	-
Light Airborne Multi-Purpose System (HSL)	ASW	SH2/SH6	14	X	-
Maritime Patrol (VP)	ASW	P3	24	X	X
Electronic Warforce (VQ)	EW	EA3, EP3	2	X	X
Force Support, Jet (VR, VC)	SUPPORT	C9, C2, A4	13	X	X
Force Support, Prop. (VQ)	SUPPORT	EC130	2	X	X
Force Support, Helo. (HC, HM)	SUPPORT	N47, N53	8	X	-

ACW - Air to Ground Warfare
AAM - Anti Air Warfare
EW - Electronic Warfare
ASW - Anti Submarine Warfare

X indicates NA/NFO's required in Subcommunity
- indicates NFO's not required in Subcommunity

Within each subcommunity, requirements are further partitioned by the grade level of the requirement. Four grade levels have been established:

- LT and Below
- LCDR
- CDR
- Senior Commander

The fourth category, Senior Commander, was established when it became apparent that significant numbers of billets require commanders who have had experience as commanding officers. The model identifies senior commanders in the inventory as commanders with more than three years in grade.

The division of Aviation Officer requirements into subcommunities based on weapon system characteristics has the important advantage of providing a direct connection between force levels and Aviation Officer requirements. Force level decisions during the planning process affecting the number of aircraft or the number of Aviation Squadrons can dramatically influence the number of Aviation Officers required. Recomputation of these manpower requirements in response to force level changes involves adjustments to both direct squadron requirements and certain indirect requirements, such as manpower required to train personnel to meet direct requirements. In the dynamics of the planning process, when potential force level changes are frequent, these computations are tedious and subject to error. Since force level changes are easily related to a subcommunity or group of subcommunities, it is possible to express subcommunity related manpower changes as a function of force level changes. In general manpower changes are given by:

(1) $\Delta MP = \Delta NS \times AC \times CF \times NC + AF \times IN$

Where

ΔMP = Change in Manpower Requirement
ΔNS = Change in Number of Subcommunity Squadrons
AC = Number of Aircraft per Squadron
CF = Crew Factor - Number of Crews Required per Assigned Aircraft
NC = Number of Naval Aviators or NFOs Required per Crew.
AF = Annual Training Flow required to Support Δ MP
IN = Number of Instructors Required to Produce the Required Annual flow.

The first term on the right relates to the direct squadron requirements, while the second refers to indirect requirements. These functional relationships are incorporated in the Aviation Officer Requirements Model. User specification of force level changes causes an automatic recomputation of manpower requirements for affected subcommunities. In addition, the user can alter any or all of the parameters specified on the right hand side of the equation so that analysis of their impact on manpower requirements at a given force level is also possible.

While establishing the force level dependence of Aviation Officer requirements is crucially important to the creation of a successful planning model, it should be pointed out that force level dependent manpower requirements represent only a fraction of the total requirement for Aviation Officers. In the previous report of this study2/ an analysis of the then current requirements was presented which attributes about 62 percent of total Aviation Officer requirements to operating squadrons and associated indirect support (principally training). The remaining 38 percent of requirements are associated with the operation of the shore establishment of the Navy or major

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2/Ibid., p. 14.

staffs ashore. Since these requirements are not directly related to force levels, they are included in the subcommunity-based requirements statement by means of an allocation process which is described below.

The principal problem in establishing an allocation procedure for requirements which are not specific to the defined subcommunities is the definition of a basis for allocation that will result in "fair sharing" of these requirements among subcommunities. Depending on the nature of the requirement, it may be preferable to allocate indirect requirements based on the ratio of direct subcommunity requirements to:

- Total Direct Naval Aviator Requirements
- Total Direct Naval Flight Officer Requirements
- Total Direct Aviation Officer Requirements

Additionally, for certain training requirements it is more appropriate to base allocation on annual graduate flows rather than on total requirements.

The Aviation Officer Requirements Model partitions the total requirement into Activities, which classify billet requirements in terms of the general purpose which the requirement is supporting. For activities where allocation is necessary, the appropriate allocation basis is established. Seven activities, described in Table II, are defined. The allocation method used with each activity is also identified in the Table.

It will be noted that the first four activities in Table II involve requirements for which frequent flights are required. The last three do not. This effectively segregates billets coded for Duty Involving Flying (DIF) within the requirements structure. This in turn makes it possible to examine

TABLE II

DEFINITION OF ACTIVITIES FOR
AVIATION OFFICER REQUIREMENTS MODEL

ACTIVITY	DESCRIPTION	ALLOCATION METHOD
1. Force and Force Support Squadrons	Naval Aviators or Naval Flight Officers are required for the operation and control of air weapon systems in tactical units.	Direct requirements.
2. Fleet Readiness Squadrons	Naval Aviators or Naval Flight Officers are required to train others in the operation and control of air weapon systems within a subcommunity.	Based on annual flow of graduates within the subcommunity. Force level driven.
3. Training Command Squadrons	Naval Aviators or Naval Flight Officers are required to provide entry level training for student Naval Aviators and student Naval Flight Officers.	Based on annual flow of graduates to the subcommunity. Indirectly driven by force levels.
4. RDT&E	Naval Aviators or Naval Flight Officers are required for experimental, developmental, or test and evaluation of air weapon systems.	Based on general Aviation Officer skills required (Helicopter Pilot, Navigator, etc.). Allocation only to Subcummunities possessing required skills.
5. Afloat (ships company and afloat staffs	Naval Aviators or Naval Flight Officers are required to supply aviation experience in the operation of air-capable ships or as members of afloat staffs.	Based on total Aviation Officer, total Naval Aviator, or total Naval Flight Officer requirements in Force and Force Support Squadrons.
6. Professional Development (PG School/War	Naval Aviators or Naval Flight Officers are required to receive advanced education as part of the large effort to enhance the technical competence and managerial skills of the officer corps.	Based on total subcommunity requirements.
7. Other	Naval Aviators or Naval Flight Officers are required to provide aviation experience in the shore stations and on major staffs ashore.	Based on total Aviation Officer requirements.

the influence of planning decisions on the levels of operational flight experience in terms consistent with the requirements of the Aviation Career Incentive Pay Act.[3]

In summary, the Aviation Officer Requirements Model specifies requirements by:

- Dividing the total Aviation Officer requirement into subcommunities based on specialty (Naval Aviator or Naval Flight Officer) and on Weapon System/Mission (Fighter, Helicopter ASW). The resulting set contains 14 Naval Aviator subcommunities and 9 Naval Flight Officer subcommunities.
- Dividing requirements within each subcommunity based on grade level and activity. Four grade levels and seven activities are defined.

The subcommunity design is mutually exclusive and exhaustive; that is, the sum of the requirements in the 23 subcommunities equals the total Aviation Officer requirement and each individual billet specification is represented in only one subcommunity. Given the design, the objective of the manpower planning process becomes the creation of a set subcommunity inventories that meet the requirement in detail.

C. INVENTORY SPECIFICATION

The essential elements required to describe the Aviation Officer Inventory are the specification of gains or losses and the mechanism used to describe the evolution of the inventory over time.

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[3] Ibid., pp. 6-8.

Gains to the Aviation Officer inventory come only by means of graduation from initial entry training and designation as either a Naval Aviator or Naval Flight Officer. Time of designation is the reference point for inventory ageing. Individuals in the inventory have a chronological age expressed in years of aviation service measured from designation. Annual cohorts are identified as Aviation Year Groups, consisting of all officers designated in a given fiscal year. Gains to inventory, or accessions, are the total number of fiscal year graduates from undergraduate flight training. The size of the first year cohort is taken as equal to accessions minus losses in the first year. The size of the cohort in the nth year of aviation service is the number of aviation officers remaining at year n-1 less losses in year N.

The Aviation Officer Requirements Model assumes that losses in a given year are uniformly distributed throughout the year. A further assumption is made that for substantial periods of time during the life of a given cohort year-to-year loss rates are constant. The effect of these assumptions is to permit representation of the inventory ageing process by means of a series of straight line segments as in Figure 1. The principal features of Figure 1 are described in detail in the previous report of this study.[4] The breakpoints in the figure are listed below:

- MSR (Minimum Service Requirement) - The length of the service obligation incurred by an Aviation Officer upon designation (currently five years).
- MSR+2 - The point at which officer retention is measured (currently seven years for Aviation Officers).
- Career Stable Point - The point at which an aviation year group stabilizes at relatively low mid-career loss rates.

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[4] Ibid., pp. 6-8.

- 18 Year Point - The point at which losses begin to occur due to initial retirement eligibility and promotion to the grade of captain. (Captains are not counted in specifying either Aviation Officer requirements or inventory.)
- 20 Year Point - The point at which early retirement and promotion losses are largely completed.

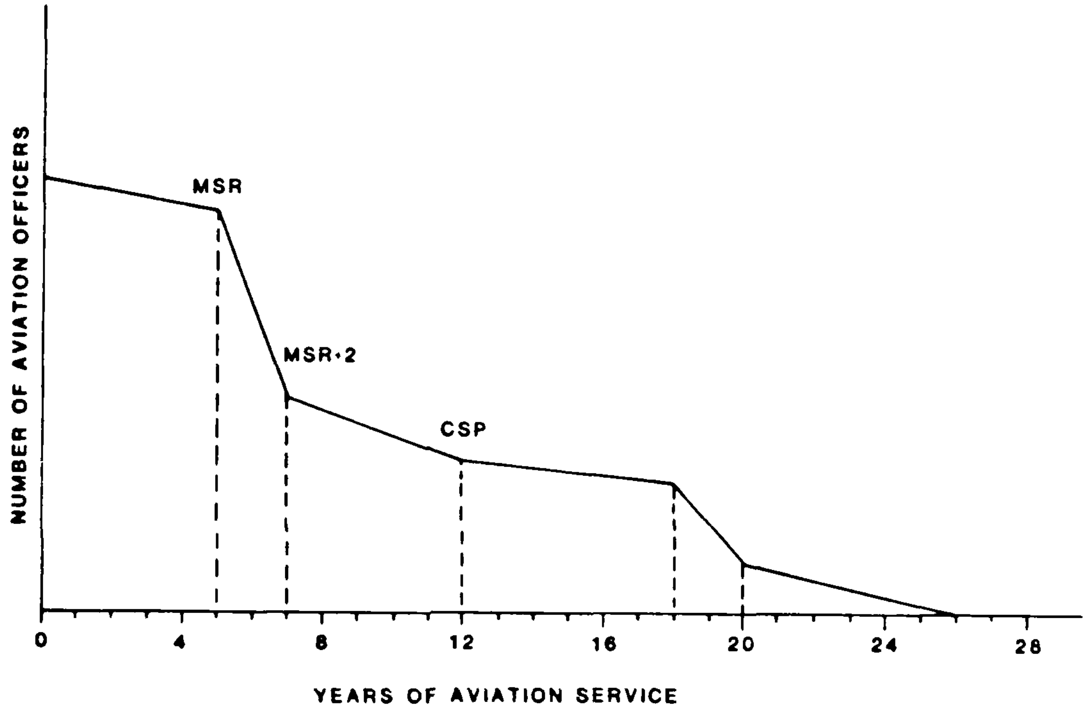

FIGURE 1
THE AVIATION OFFICER INVENTORY

The shape of Figure 1 can be completely specified by means of the continuation vector C_i where:

$$(2) \quad C_i = \frac{N_i}{N_{i-1}}$$

is the ratio of number of entries into the i^{th} year of aviation service to the number entering the (i-1)th year.

Then if the number of personnel entering year M is known the number in a later year n can be determined:

$$(3) \quad N_n = N_m \prod_{i=m}^{n} C_i$$

More specifically:

$$(4) \quad N_{MSR+2} = N_{MSR-1} \times \prod_{i=MSR-1}^{MSR} C_i$$

And:

$$(5) \quad \text{RETENTION} = \frac{N_{MSR+2}}{N_{MSR-1}} \quad \text{(BY DEFINITION)}$$

The importance of (4) is that the relationship between retention and overall inventory shape is established.

The Aviation Officer Requirements Model generates an inventory for each subcommunity in the form of Figure 1. Very briefly, it does this by estimating subcommunity accessions based on requirements and shaping the resulting steady state inventory.

In response to user specification of subcommunity retention, this inventory is then tested on an iterative basis (adjusting accessions as necessary) to establish a final requirements/inventory match to grade level detail.

In order to create an exact match between model inventory and requirements statements, it is necessary to specify some mechanism for converting years of aviation service to grade level. Requirements are specified by grade level. Thus, in assessing the ability to meet the requirement for Lieutenant Commanders, it is necessary to know what part of the inventory consists of Lieutenant Commanders. Fortunately, the correlation between grade level and years of Aviation service is good.

Aviation Year groups are composed of officers who are predominantly from two or three adjacent commissioned year groups.[5] The Aviation Officer Requirements Model uses promotion flow points, adjusted to the years of Aviation Service scale,[6] to partition the inventory by grade. The promotion flow point parameters are under user control.

The introduction of promotion flow points into the inventory specification process adds additional detail to the inventory description. The inventory becomes more than a set of one year cohorts of constantly decreasing size. Certain other characteristics of the cohorts are also important. These characteristics are acquired by individuals as a result of assignments to fill requirements. They become important as cohort characteristics when the experience they imply is either required or desired as a pre-requisite for future assignments. Experience requirements for squadron department heads and commanding officers are obvious examples. Most senior positions in the requirements structure have flight hour, educational, or specific mission area requirements.

An important objective of personnel management is to ensure that the inventory will contain the proper mix of skills and experience in the future. Because of this, the way in which inventory can be used to meet requirements is constrained in ways that should be accounted for in the planning process. The unique feature of the Aviation Officer Requirements Model is that it provides a mechanism for accomplishing this by accounting for those personnel management policies which govern the development of the Aviation Officer inventory and constrain its application to requirements.

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[5] Commissioned year groups consist of all officers who were commissioned in a given fiscal year.

[6] The mean time of designation for Aviation Officers is at 1.5 years of commissioned service. Thus: YAS = YCS-1.5

D. PERSONNEL MANAGEMENT POLICIES

The Aviation Officer Requirements Model accounts for personnel management policy by forcing the inventory-requirements match to take place in the context of a career path network. This network is simply a graph of tours classified by activitiy and sequential position. A sequence of connected arcs represents a potential career path through the network for an officer or group of officers. Associated with each tour number-activity node in the network is a tour length, input flow, and output flow. Arcs connecting the network nodes represent permissible transitions within the network. The absence of an arc connecting two sequential nodes means that the transition is barred, either explicitly or implicitly by current personnel management policies.

Figure 2 is the network diagram employed in the Aviation Officer Requirements Model. Network nodes are identified by a two-digit number. The first digit identifies the activity in accordance with the entry numbers of Table II. The second digit identifies the tour number. Some of the currently permissible arc sequences are diagrammed in Figure 2. The portrayal is complete through tour 2. However, in the interest of clarity only a representative sample of permissible sequences beyond tour 2 is portrayed. All network flows originate at node 10 which represents the output of undergraduate flight training.

Some specific examples are given below to illustrate how personnel management policy is represented in the network of Figure 2:

- Training command output may only be assigned to fleet squadrons or to the training command (*Plowback Instructors*). *The only permissible arcs* from node 10 are (10-11) and (10-31).

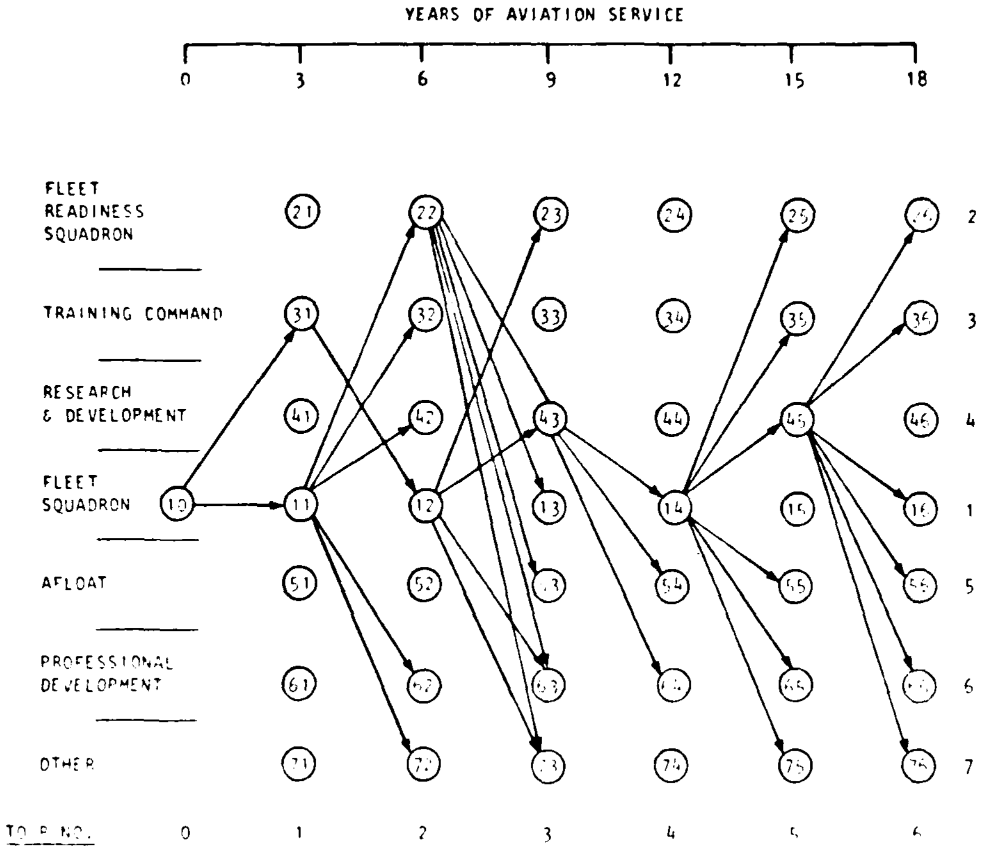
YEARS OF AVIATION SERVICE
0
3
6
9
12
15
18
FLEET READINESS SQUADRON
TRAINING COMMAND
RESEARCH & DEVELOPMENT
FLEET SQUADRON
AFLOAT
PROFESSIONAL DEVELOPMENT
OTHER
TOUR NO.
0
1
2
3
4
5
6
21
22
23
24
25
26
31
32
33
34
35
36
41
42
43
44
45
46
10
11
12
13
14
15
16
51
52
53
54
55
56
61
62
63
64
65
66
71
72
73
74
75
76
2
3
4
1
5
6
7

FIGURE 2
AVIATION OFFICER CAREER PATH NETWORK

- Plowback Instructors are guaranteed a subsequent fleet tour. The only permissible arc from node 31 is (31-12).
- Sequential sea duty tours are not permitted. The transition (11-52) is barred.

It should be apparent that any policy or procedure having to do with personnel assignment can be represented in the network diagram. Furthermore, since the basic variable represented is personnel flow and since a tour length is associated with each network node, the number of officers available at a node to meet the specific requirements for the activity involved can be computed.[7] If the match of inventory to requirements is made within the constraints imposed by the network, the planner is assured that it is feasible to meet immediate requirements while developing a viable skill experience mix in the inventory.

The Aviation Officer Requirements Model imposes the network model described above on the inventory of Aviation Officers in each subcommunity. That is, inventory is assumed to flow only on permissible network arcs. Therefore, the number of officers at a given activity with a given number of years of aviation service is a function of the total flow to the appropriate network node. Network specification both in terms of permissible transitions and tour length at any node are under user control. Thus the user can test the impact of policy alternatives on requirements.

E. MODEL IMPLEMENTATION

The Aviation Officer Requirements Model has been implemented as a "user friendly," interactive computer program in a WANG 2200 VS computer. The model is "user friendly" in that no special competence in the operation of the computer is required of the user (although familiarity with the Aviation Officer requirements determation process is presumed). The user is cued by means of a series of CRT displays through the process of model setup, selection of run alternatives, and designation of outputs. The displays are completely self-explanatory menus. They allow the user to extensively alter model parameters and run modes. The model is reasonably fast, so that the user can make multiple runs in a single sitting. Provision is made for both the visual display of results and hard copy printouts.

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[7] Ibid., p. 23.

Appendix A to this report contains a user's manual that gives a detailed description of the Model's operation. Appendix B contains a program source listing for the model which is extensively documented internally. Appendix C contains the complete set of model default parameters.

The following discussion gives a general overview of model functioning and identifies the parameters which are under user control.

At the beginning of each model iteration, the user selects a subcommunity or subcommunities to be included in the run. Runs are made on a subcommunity basis. Upon subcommunity selection, a complete set of default values for the model parameters is loaded. The user is then led through a series of displays which show the default parameters and give the opportunity to make desired changes. Provision is made for bypassing displays as desired. The following model parameters are placed under user control in this process:

1. Requirements Parameters

    a. Force Level Parameters
        - Number of Squadrons in the Subcommunity
        - Number of Aircraft per Squadron
        - Crew Factor (Number of Crews/Assigned Aircraft)
        - Aviators or NFOs per Crew
        - Squadron Grade Structure

    b. Training Parameters
        - Undergraduate Training Pipeline Source
        - Undergraduate Instructor/Graduate Ratio
        - Training Squadron Grade Structure
        - Readiness Squadron Grade Structure

    c. Allocation Parameters
        - Subcommunity Fraction of All Naval Aviators or NFOs
        - Subcommunity Fraction of Strike Naval Aviators or NFOs
        - Subcommunity Fraction of Carrier-Based Subcommunities
        - Subcommunity Fraction of All Aviation Officers

2. Inventory Parameters

    a. Subcommunity Retention
    b. Minimum Service Requirement
    c. Career Stable Point

3. Personnel Management Policies

   a. For Each Node in the Career Path Network (49)
      - Permissible Precedent Nodes
      - Node Tour Length

   b. Promotion Flow Points to LCDR and CDR

   c. Plowback Instructor Fraction

   d. Professional Education
      - Postgraduate Education Fraction
      - War College Education Fraction

Execution of the model solution is straightforward. A trial inventory is generated that will just meet the subcommunity numerical requirement. The accessions implied by this inventory are then divided as specified by the plowback fraction, and flows to fleet squadrons and training command are calculated. The first tour length required to make fleet squadron flow meet fleet squadron requirements is calculated and recorded. Flows out of the first fleet squadron node and the training command node are then calculated in preparation for second tour processing.

For the second and subsequent tours, each source flow is checked against all destinations to identify permissible transitions. Where transitions are permitted, the requirement associated with the destination is examined. If the node requirement is greater than zero, source flow is assigned such that either the requirement is met or the source flow is exhausted. The source flow and destination node requirement are then appropriately decremented.

The above procedure is followed for all permissible source flow-destination node combinations within the tour. The scanning sequence is such that low activity number destination nodes (Fleet Tour = 1) are examined first. Thus, nodes involving operational flying assignments (Activities 1-4) tend to be favored.

When the node scan for a given tour is complete, there may still be some unused source flow, either because all destination node requirements have been met, or because source nodes with available flow have no permissible transitions to destination nodes with unfilled requirements. When this occurs, the remaining source flows are sent to an unconstrained destination labeled "Out-of-Aviation". Processing for this dummy node consists only of compution of the proper output flow (based on the tour length specified for "Other") and accounting for the resulting inventory at that destination.[8]

The node scanning procedure described above is repeated for successive tours through tour 7. Upon completion of tour 7, the degree of requirements fill is examined. If all requirements have been met, the computation is complete and a transfer is made to the model output routines. If all requirements have not been met, an inventory increment sufficient to cover unmet requirements is generated. The network flow computations are then repeated. Iterations continue until all requirements are met.

The model output routines consist of a series of computations and formatting routines that tabulate subcommunity results, develop some elementary derivative parameters, and print a summary output. An example of output format is included in Appendix A. The following outputs are currently provided in the subcommunity summary printout:

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[8] This process is analagous to that by which Aviation Officers are used to fill non-aviation billets (billets coded either 1000 (any line officer) or 1050 (any warfare specialty)). However, it should be stressed that the model flows Aviation Officers to the Out-Of-Aviation Activity ONLY when it cannot make an aviation assignment. In actual practice, a portion of 1000 and 1050 billets are routinely allocated to the aviation community as requirements. These additional requirements may at times enjoy a higher fill priority than aviation billets. The approach taken in the model treats Out-Of-Aviation as pure surplus. This was done in order to provide planners who use the model with an estimate of future Ability to fill non-aviation billet demand.

1. Community Description

    - Number of Squadrons
    - Aircraft per Squadron
    - Crew Factor
    - Naval Aviators (NFOs) per Crew
    - Subcommunity Retention
    - Plowback Fraction

2. Projected Subcommunity Population Characteristics

    - Grade Distribution
    - Command Opportunity (Squadron)
    - Department head Opportunity (Squadron)
    - Annual Accessions to Designator
    - Annual Accessions to Training
    - First Tour Length

3. Subcommunity Employment Projections

    - Distribution by Grade and Activity
    - Aviation Career Incentive Pay-Gate Achievement Projections
    - Fraction of Subcommunity Employed in Non-Aviation Assignments
    - Total Annual Permanent Change of Station Moves Attributable to the Subcommunity

The Aviation Officer Requirements Model is basically a simulation. For each subcommunity, a set of structured requirements is presented. An accession level is established and made to flow through the model under a specified set of personnel management policies. In essence, the model acts like an omniscient detailer, meeting all subcommunity requirements and never violating the policy constraints. The Aviation Officer manpower planner is assured that the solution presented is feasible in the sense that, under the initial conditions specified, the subcommunity inventory recommended can meet all requirements. By summing over all subcommunities, a statement of total Aviation Officer requirements is obtained.

F. ENHANCEMENTS TO THE BASIC MODEL

1. Introduction

During the current effort on the Aviation Officer Requirements Model, a number of significant improvements has been made. In making changes, the basic format in which the user interacts with the model was preserved. The user who is familiar with the Version 5.0[9] model will find the current version almost identical when making single subcommunity runs. However, there are a number of additional features in the current version and changes to previous computation procedures with which the user should be familiar. They are discussed below.

2. Multiple Community Runs

The original version of the Aviation Officer Requirements Model made only single subcommunity runs. In order to obtain a complete solution for all Aviation Officers, it was necessary to set up and run all 23 subcommunities in sequence. Once all runs had been made, considerable additional manual calculation was required to obtain totals and averages. The current version of the model contains a Multiple Run Option which eliminates most of this post-processing calculation.

In developing the Multiple Run Option, the following three basic design objectives were established:

- Maximize Flexibility - Let the user decide which subcommunities are involved. Account for both subcommunities selected and those not selected within the program.
- Minimize Setup Time and Effort - Limit the number of key strokes needed to setup and run 23 subcommunities. Permit the user to bypass data entry options where possible.
- Minimize the Need for Post Processing Calculation - Perform Summary Calculations across subcommunities and prepare appropriate outputs within the program.

All of these objectives have been met.

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[9] O'Connor, Aviation Officer Requirements Study, Appendix B. (Version 5.0 is the model as previously described. The enhanced model is Version 7.0.)

The approach taken in establishing the Multiple Run Option was to allow the user to place subcommunities into groups of his choice; that is, the user is permitted to define any number of subcommunity groupings between 1 (all Aviation Officers in one group) and 23 (each subcommunity in a separate group). Within each group, certain model parameters are assumed to be constant (e.g., Policy Variables). Others are permitted to vary at user option (e.g., Career Path parameters). In any case, the user is afforded at least one opportunity to review default model parameters[10/] for each group. He may change any or all of these values. In those cases where intra-group variation is permitted, he may change values for each subcommunity within the group or elect to bypass review of the remaining subcommunities, assigning a single change to all members of the group.

As with all other parameters in the Aviation Officer Requirements Model, the Multiple Run Option is preset to a default subcommunity grouping. This default grouping classifies the 23 subcommunities into 7 groups (3 for Naval Aviators, 4 for Naval Flight Officers). The default groups consist of subcommunities with the same undergraduate training pipeline source. Definitions of these groups follow:

a. Naval Aviators

- Strike Pipeline (Group A)
  - Light Attack (VA)
  - Fighter (VF)
  - Medium Attack (VAM)
  - Electronic Warfare (VAQ)
  - Carrier Base ASW (VS)
  - Force Support, Jet

[10/] The Aviation Officer Requirements Model contains a complete set of model parameters representing the approximate state of affairs in the Aviation Officer Community in FY 81. These values are the default values of model parameters.

- Maritime Patrol Pipeline (Group B)
  - Maritime Patrol (VP)
  - Early Warning (VAW)
  - Electronic Warefare (VQ)
  - Force Support - Prop

- Helicopter Pipeline (Group C)
  - Helicopter ASW (HS)
  - LAMPS MK I (HSL)
  - LAMPS MK III (HSL)
  - FORCE Support - Helo

b. Naval Flight Officers

- Radar Intercept Officer Pipeline (Group D)
  - Fighter

- Attack Navigation Pipeline (Group E)
  - Medium Attack (VAM)
  - Electronic Warfare (VAQ)
  - Carrier ASW (VS)
  - Force Support - Jet

- Airborne Tactical Data Systems Pipeline (Group F)
  - Early Warning (VAW)

- Navigator Pipeline (Group G)
  - Maritime Patrol (VP)
  - Electronic Warfare (VQ)
  - Force Support - Prop

Groups are identified by a single letter. The process of group formation consists of assigning a single letter to each subcommunity. Upon entering the Multiple Community Run option, the user is presented with a list of subcommunities and asked to make group assignments. At this time he can:

- o Make no entry, in which case the default group assignment will be used;
- o Enter a group assignment pattern of his own selection;
- o Enter a zero for subcommunities to be excluded from the run.

Once group assignments have been made, the user is given the opportunity to make model parameter changes for each group in succession. At the conclusion of parameter adjustment for each group, a listing of group members is presented for review. At this point, the option of resetting the group selection process is available.

After group selection and parameter adjustment, model solution proceeds on a subcommunity by subcommunity basis for each selected group. Summary sheets are prepared for each subcommunity processed. In addition, separate summary sheets are prepared for Naval Aviators and Naval Flight Officers. These latter sheets also contain a list of subcommunities excluded from the run by the user. A detailed presentation of the operation of the Multiple Community Run Option is given in Appendix A. Sample output summary sheets are also presented.

3. Optimization of Assignment Patterns

As originally designed, the Aviation Officer Requirements model made ource to destination flow assignments using the following procedure:

a. The highest numbered source node having positive source flow available was identified (Activity 7, Other, is the highest numbered; Activity 1 is the lowest).

b. The lowest numbered destination node having unmet requirements was identified.

c. If flow available from a. was less or equal than that needed to meet requirements b., the flow was assigned and the requirement decremented appropriately. Available flow was reduced to zero and processing continued at a.

d. If flow available from a. was greater than that needed to meet requirements, sufficient flow was assigned to meet the requirement. Source flow and requirement were decremented. Processing continued at b.

e. If destination node scanning reached Node 7 with flow still available, the remaining flow was assigned to Out-Of-Aviation. Processing continued at a.

f. Upon completion of source node scanning at Node 1, the tour number was incremented and the process repeated.

This procedure has the advantage of defining a feasible flow pattern which:

- Favors flow assignment to activities consisting of Operational Flying Billets (Activities 1-4); and
- Gives assignment priority to flows from activities consisting of non-operational flying billets (Activities 7 through 5).

Thus the procedure is similar to what could be expected to be the general philosophy governing the personnel assignment process; namely "fill cockpits first" and "get non-flying aviators back in the cockpit."

The above procedure has a flaw which can lead to an overstatement of requirements. Source flow assignments early in the scanning process may completely foreclose the assignment of flow from later nodes, thereby forcing flow to Out-Of-Aviation. An alternative assignment at the earlier node may well have permitted the assignment from the later node to an aviation assignment, thereby reducing the overall flow to Out-Of-Aviation. Since an obvious planning objective ought to be the minimization of the inventory specified to meet requirements, the procedure outlined above was modified to provide assurance that the flow pattern adopted at each tour was such as to maximize the fill of billets at aviation assignments. This was accomplished by adapting the problem of specifying the flow between nodes in a given tour so as to make it amenable to solution using the maximum flow algorithm of network theory.11/

Figure 3 is a network diagram illustrating the device used to formulate the tour source-destination flows as a maximum flow problem. The seven destination nodes for Tour i are shown right-of-center in ascending order of acti-

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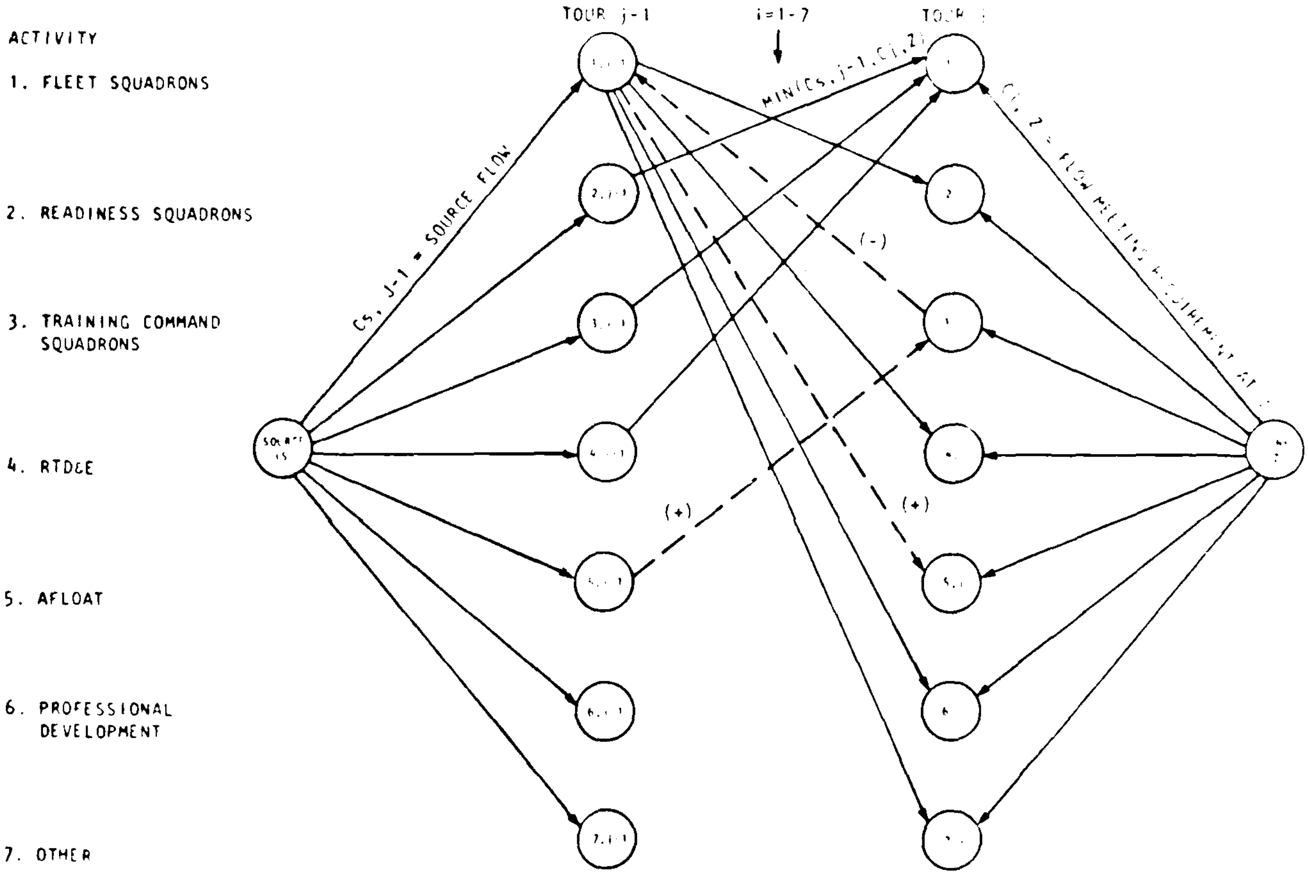
11/See, for example, H.M. Wagner, Principles of Operations Research, 2nd ed. (Englewood Cliff, New Jersey: Prentice Hall, 1969), Appendix I.

vity number (i=1-7). On the left the source nodes representing flows out of tour j-1 are shown in a similar manner. Arcs connecting these two node sets represent the permissible transitions between tour j-1 and tour j. Finally, it is conceptually useful to envision all flows as originating at a single source and terminating at a single sink.


ACTIVITY
1. FLEET SQUADRONS
2. READINESS SQUADRONS
3. TRAINING COMMAND SQUADRONS
4. RTD&E
5. AFLOAT
6. PROFESSIONAL DEVELOPMENT
7. OTHER
TOUR j-1
i=1-7
TOUR j
CS, j-1 = SOURCE FLOW
MIN(CS, j-1, CI, 2)
CI, 2 = FLOW MEETING REQUIREMENT AT
(-)
(+)
(+)
2, j-1
SOURCE

NOTE ONLY PARTIAL IN-TOUR ARC STRUCTURE SHOWN

FIGURE 3

MAXIMUM FLOW PROBLEM FOR TOUR TRANSITIONS

Arc capacities in Figure 3 are set as follows:

a. Source to Nodes (j-1): Arc capacity is equal to the available flow at the (j-1) Node. The total source flow is therefore equal to the total output flow from the previous tour.

b. Nodes (j-1) to Nodes (j): Arc capacity is the lesser of:

- Available source flow;
- The flow which will just meet the remaining requirement at Node (i,j).12/ Subject to the constraint that barred transitions have zero flow capacity.

c. Nodes (j) to Sink: Arc capacity is the flow which will just meet the remaining requirement at Node (i,j).

When arc capacities are specified in the manner outlined above, any resulting flows within the tour are guaranteed to be within source node flow constraints and less than or equal to the flow required to fill destination node requirements.

The network of Figure 3 is solved using the maximum flow algorithm.13/ This algorithm employs a systematic search of all possible paths through the network to find one that will permit an increase in total network flow. The procedure terminates when no such path exists. In the present case, the geometry of the network permits a simplified path scanning process which

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12/The flow meeting the remaining requirement at Node (i,j) is given by

$$(6)\quad F_{i,j} = \frac{2 \times REQ_{i,j}}{2 \times TL - \sum_{k=t}^{TL} \left(\frac{1 - r_{t+k}}{r_t} \right) \times \prod_{l=t}^{k} R_{t+l}}$$

Where: Fij = Arc capacity for Arcs terminating at Node (i,j)
REQij = Remaining Requirement at Node (i,j)
TL = Tour Length Specified for Node (i,j)
RT = Continuation rate for year t
Note: t and TL specified in years

13/F.B. Hiller and G.J. Lieberman, Introduction to Operations Research, (San Francisco: Holden-Day, Inc., August 1967), pp. 214-218 for the specific algorithm used.

greatly simplifies computer implementation of the algorithm.

Consider an initial trial solution for the network of Figure 3 which simply proceeds from source node arc to source node arc, allocating as much of the source flow as possible to available paths through the remainder of the network. At the conclusion of this step, one of the three conditions will hold:

a. The capacity specified for source flow arcs will be exhausted, indicating an optimum flow;

b. The capacity specified for sink flow arcs will be exhausted, indicating an optimum flow;

c. The capacity will remain on one or more source flow arcs AND on one or more sink flow arcs, indicating a potential for increased flow. In this case, iteration is required until either a. or b. above occurs.

Given the condition described in c. above, the objective of the algorithm becomes the elimination of positive flows on either side of the network. In the general case, the positive source capacities will not be connected to the positive sink capacities (since otherwise the capacities would have been eliminated during initial assignment of flows). Path analysis then consists of transferring existing flows to other feasible sources/destinations so as to create a positive flow capacity on some arc out of the source and a positive flow capacity on some arc into the destination. The proper adjustment can be found by defining a path between the two nodes consisting of forward arcs (j-1 to j) with positive remaining capacity and reverse arcs (j to j-1) currently having positive (forward) flow.

Having found such a path, the proper adjustment is given by the minimum of the available capacity on forward arcs or current flow on reverse arcs. The adjustment can be made by simply proceeding along the defined path, adding the flow on forward paths and subtracting it on reverse paths. When no such path can be found, maximum possible flow has been attained. The dashed lines in Figure 3 represent one such path search for the case where positive source flow remains at node (5, j-1) and requirements remain at node (5,j).

When the procedure outlined above terminates, any remaining source flow is surplus to aviation requirements for the tour in question. This flow is then assigned to the Out-of-Aviation destination. For any given tour, this is the minimum flow that can be achieved, given the specification of tour transitions and destination tour lengths provided by the user.

The implementation of the maximum flow algorithm in the Aviation Officer Requirements Model will not be apparent to the user. Model operation is functionally similar and no additional inputs are required of the user. Provision is made for printing out interim network solutions when the in-process-monitor option is selected. The user familiar with the previous version of the model will also notice a significant reduction (about 10 percent) in both Out-Of-Aviation assignments and overall requirements.

4. Inclusion of Promotion Flow Points

The original version of the Aviation Officer Requirements Model converted inventory aviation year groups to an equivalent grade level for purposes of inventory/requirements comparisons. This was done by establishing grade level transitions at 8.5 years of aviation service (03 to 04) and 13.5 years of aviation service (04 to 05). A revision has now been incorporated to allow the user to specify promotion flow points in years of commissioned service.

The model processes user-specified promotion flow points by converting the input from years to months and subtracting 18 months to convert the entered value to months of aviation service. (The model makes all calculations in time increments of 1 month and expresses results in units of 1 year.)

Default values for the Promotion Flow Point Parameter are 10 years (03 to 04) and 15 years (04 to 05). These values correspond to the values used in the original version of the model.

5. Upward Detailing

Upward detailing refers to the process by which individuals at one grade level are used to fill requirements at the next higher grade level (e.g., the assignment of a Lieutenant to fill a Lieutenant Commander billet). A feature which allows the user to implement a simulation of this process has been incorporated in the model to allow planners to directly assess the effects of grade level mismatches between inventory and requirements. Inferences regarding such mismatches can be drawn from Out-Of-Aviation flows. However, if mismatches are severe, the model is likely to drive inventory up and first tour length down, thereby distorting indirect requirement flows. By allowing junior surpluses to meet senior requirements, this effect is avoided and the numbers so assigned become a direct indicator of grade imbalance. Furthermore, the planner gains insight into the long term personnel management problems likely to attend a given solution.

Implementation of upward detailing in the model is straightforward. The user specifies an upper limit on the fraction of senior billets in any activity which are permitted to be filled by flows from tours at a lower grade level (default value is set to 20 percent). The model, while processing flows, establishes maximum flow within each tour as described above. However, if upward detailing is permitted, surplus flows from the tour assignment process are first flowed against requirements at the next higher grade level before being assigned to Out-of-Aviation. Feasible assignments are made. Resulting flows are recorded in the current tour, while requirements are decremented at the higher grade level. In the final result, the source grade level will be shown in surplus for the activities involved, while the destination grade level will be shown in deficit. The model reports the aggregate percentage of requirements met at each grade level by upward detailing.

In addition to the overall constraint described above, upward detailing is constrained in the following ways:

- Upward detailing to command (Tour 6, Activities 1-3) is not allowed;
- Upward detailing to 04 billets in squadrons (Tours 4 and 5, Activities 1-3) is constrained to preserve three LCDR billets for squadrons, with only Naval Aviators and four LCDR billets for squadrons with both Aviators and NFOs. (This preserves a minimum flow for department head level billets);
- Upward detailing to post command afloat billets (Tour 7, Activity 5) is not allowed;
- Upward detailing is not allowed prior to tour three for any activity.

The above restrictions were adopted as being reasonably representative of current practice with respect to upward detailing. They are not variable at user option, but they could easily be modified by means of minor program changes within the model.

6. Automatic Allocation Parameter Scaling

The Aviation Officer Requirements Model uses a set of allocation factors to determine the assignment of billets to a subcommunity in those cases where the requirement cannot be directly or indirectly associated with the subcommunity mission. Activities 4 through 7 consist of allocated billets. The allocation base is the direct (Activity 1) requirement, with each subcommunity receiving a fraction of non-direct requirements equal to the ratio of subcommunity direct requirements to total Navy direct requirements. Three major allocation bases are employed--one for Naval Aviator billets, a second for Naval Flight Officer billets, and a third for billets designated for either Naval Aviators or Naval Flight Officers. A fourth allocation parameter is used only to allocate carrier air wing staff positions among carrier-based subcommunities. Thus there are four allocation parameters associated with each subcommunity.

The application of the allocation factors in subcommunity definition assumes that the subcommunities collectively cover all Aviation Officer requirements. The sum of the allocation factors of each type over all subcommunities equals one. These factors are presented to the user as model parameters under his control primarily so that they can be adjusted in response to force level changes.

The problem with allocation factor changes is that if one factor in a class is changed, the remaining factors over all subcommunities must also be adjusted to maintain a unity summation. In the original version of the model, the user had to make these adjustments manually for each subcommunity for which a run was desired. For complex force level changes, the process was tedious and subject to both computational and entry errors. The current version of the model corrects this deficiency.

The Aviation Officer Requirements Model now automatically rescales the allocation parameters. The user is assured a consistent set of allocation parameters over all subcommunities if he changes the number of squadrons in a given subcommunity, or if he alters one of the allocation parameters for a subcommunity.

7. Total Permanent Change of Station (PCS) Moves

A great deal of attention is currently being directed to the cost of moving personnel from place to place within the Navy. Congressional interest in reducing these costs and a series of budget shortfalls in the Military Personnel Navy Appropriation account have caused repeated expressions of concern over the frequency of personnel moves. Explicit and implicit constraints in the PCS account are having a progressively greater impact on the overall process of personnel management.

While the issue of PCS moves is not directly related to the intended use of the Aviation Officer Requirements Model, the essential variables which drive such moves are included in the model formulation. Flows between states represent the bulk of such moves, and other moves--such as the move of accessions from home to duty and the move of losses from duty to home--are easily derived from the model parameters. Thus it is possible to attribute to each subcommunity an estimate of the annual number of PCS moves resulting from a given configuration of force level and policy parameters. Since this information is potentially useful to the planner, the necessary calculations were incorporated into the model and the results presented in the community summary outputs.

8. Model Speed of Execution

In the process of revising the Aviation Officer Requirements Model, the following changes have been made which decrease model solution time:

- The method used to make initial inventory estimates and inventory increment calculations has been refined. This has significantly reduced the number of iterations necessary.

- While the adoption of the within tour optimization procedure has increased computational time, the increase is more than offset by decreases in the overall number of iterations resulting from the higher level of assignments within aviation.
- Implementation of the Multiple Run Option forced revision of a large number of processing and storage routines. In the process of revision, these routines were made more efficient.
- The model has been moved from the WANG 2200 VS 80 computer to the WANG 2200 VS 90. The VS 90 is a faster computer. (Source codes and object codes remain compatible with the VS 80.)

As result of the above factors, execution time has improved by a factor of three. For example, the version 5.0 model required approximately 7.5 minutes to complete calculations on the Light Attack Subcommunity after model setup. The current version takes 2.5 minutes to complete the same task. A multiple subcommunity run over all subcommunities typically takes 25 minutes to complete.

IV. APPLICATION OF THE MODEL

A. GENERAL

The previous sections of this report have given the underlying rationale and a detailed description of the Aviation Officer Requirements Model. The principal features of the model bearing on its utility are:

- The large number of model parameters under user control;
- The user friendly environment created for the model which facilitates its employment;
- The speed of execution which facilitates comparison of alternative strategies.

Because of the broad range of parameters available to the user, the model is highly flexible. It can be used to analyze a broad range of manpower issues. The subsections which follow demonstrate a few such applications. Others will undoubtedly come to mind. The intent here is to introduce the potential user to the model. It should be emphasized that the examples are for illustrative purposes only. The numbers do not necessarily reflect the currently specified Navy Aviation Officer requirements, nor do some of the key parameters (such as retention levels) necessarily reflect current Navy experience.

B. FORCE LEVEL VARIATIONS

The principal force level issue impacting on Naval Aviation today is the impending increase from 12 to 15 Carrier Battle Groups. Among the manpower problems attending that increase will be meeting additional air crew requirements for a minimum of two more Carrier Air Wings. Model set up and post run analysis of runs for a 12 Air Wing configuration and a 14 Wing configuration are given below:

1. Run Set Up

Two sets of two runs each were made in Multiple Community Run Mode:

- 12 Air Wing Runs
  - Carrier Based Subcommunities
  - Non-Carrier Based Subcommunities

- 14 Air Wing Runs
  - Carrier Based Subcommunities
  - Non-Carrier Based Subcommunities

The same information could have been obtained by making only two runs for all subcommunities. However, by splitting the runs as indicated, the user obtains the benefit of summary statistics which are focused on the indicated subgroups. This eliminates the necessity of gathering and summing data from individual subcommunity printouts.

Runs for both 12 and 14 carrier air wings were made at model default parameter values with the following exceptions:

- Retention
  - Fixed Wing Aviators 45%
  - Rotary Wing Aviators 50%
  - Naval Flight Officers 55%

- Tour Lengths
  - Fourth and Fifth Fleet Tours = 30 months (Default = 36 months)

These values were selected as being more representative of current experience than model default values.

2. Results

The overall results of the runs indicate an increase in Aviation Officers from 15,779 to 16,846--a total increase of 1,067. Of these, 614 are Naval Aviators and 443 are Naval Flight Officers. An analysis of these differences by activity for subcommunities which are carrier based and those which are not is presented in Table III.

TABLE III

ANALYSIS OF REQUIREMENTS CHANGE
(12 to 14 CARRIER AIR WINGS)

Model Run		Change Activities 1-3	Activities 4-7	Out-of-Aviation	Total
CV Subcommunities	NA	+584	+130	+112	+ 826
	NFO	+290	+ 61	+222	+ 573
	TOTAL	+874	+191	+334	+1399
Non-CV Subcomm.	NA	- 20	-126	- 56	- 202
	NFO	- 8	- 51	- 71	- 130
	TOTAL	- 28	-177	-127	- 332
Net All Subcomm.		+846	+ 14	+207	+1067

The changes in Activities 1-3 in Table III reflect changes in fleet manning and associated increments to training resources and the training and transient pipeline. For the CV Subcommunities, a total of 874 officers are required as a result of the addition of two Carrier Air Wings. In addition, because of the increase in relative size of the CV Subcommunities, allocation parameters are changed, resulting in an increase in requirements in Activities 4-7 of 191 officers. The increase in Out-Of-Aviation flow of 334 is caused by the large relative increase in junior officer requirements associated with the new Air Wings. These officers become available for Out-Of-Aviation assignments at more senior grades because few senior aviation requirements are added. The relatively larger increase associated with Naval Flight Officers reflects the higher retention (55 percent) assumed for NFOs.

For the Non-Carrier Subcommunities, Activities 4-7 show a decrease in requirements as a result of change in reallocation parameters. As the relative size of the CV Subcommunities increases, the Non-CV Subcommunities are allocated less of the indirect requirements.14/

The Non-CV Subcommunities also experience reduced requirements in Activities 1-3 and in Out-Of-Aviation flow. The minor change (-28) in Activities 1-3 is due to changes in transient and pipeline requirements resulting from flow patterns which tend to favor operational flying billets at the higher force levels. The reduction in Out-Of-Aviation flow reflects an improved match between inventory and requirement grade levels in these subcommunities at the retention levels assumed.

Overall, the increase in force level by two Carrier Air Wings results in a net increase in direct requirements of 846, an increase in indirect requirements of 14, and an increase in Out-Of-Aviation flow of 207. Thus, approximately 20 percent of the increase is the result of an imbalance between junior requirements and senior requirements. The user could eliminate this surplus by relaxing the 20 percent constraint on upward detailing (the model default

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14/The net change in Activities 4-7 over all subcommunities would be zero except for the fact that the model generates professional development requirements that are proportional to the population. The net increase of 14 reflects an increase in postgraduate education and War College student requirements resulting from the larger overall size of the projected Aviation Officer inventory.

value). However, a word of caution is in order regarding the interpretation of Out-Of-Aviation flow.

The Navy currently has requirements for approximately 40,000 unrestricted line officers. This includes approximately 7,500 1000/1050 billets (Any URL Officer/Any Warfare Specialist) that are not directly associated with any unrestricted line community. The aviation "fair share" of these billets is approximately 2,800. These are NOT included in the requirements statement of the Aviation Officer Requirements Model. Instead, the model identifies resources which, because of career path or grade level constraints, will be surplus to direct aviation requirements and therefore are AVAILABLE to meet non-aviation requirements. The total Out-Of-Aviation flow supplied in the baseline case (12 Air Wings) of the above analysis is 1,894--about two-thirds of a "fair share". The increment added in the force level increase to 14 Carrier Air Wings in fact increases the disparity between available fill resources and the "fair share". *The implication for the* planner is that the 1100 officer community will have to assume responsibility for a proportionately larger share of the 1000/1050 billet requirements.

The Aviation Officer Requirements Model also provides projections of Aviation Officer accession requirements and undergraduate flight training requirements. For the present case, the results summarized for CV Subcommunities and Non-CV Subcommunities are shown in Table IV.

The increase in force level from 12 to 14 Carrier Air Wings increases annual undergraduate training output requirements by 63 Naval Aviators and 45 Naval Flight Officers. Annual accessions to support the higher training rates increase by 89 student Naval Aviators and 45 student Naval Flight Officers. The mix implied in the increase is more significant to the planner. More than

TABLE IV

ACCESSIONS AND UNDERGRADUATE TRAINING REQUIREMENTS (12 VS. 14 CARRIER AIR WINGS)

Training Pipeline	CV Subcommunities		NON-CV Subcommunities		Totals	
	Accessions (12/14)	Training Rate (12/14)	Accessions 12/14	Training Rate 12/14	Accessions 12/14	Training Rate 12/14
Naval Aviator						
o Strike	458/554	326/395	124/114	8/81	528/668	414/476
(Difference)	(+96)	(+69)	(-10)	(-7)	(+86)	(+62)
o Maritime P/T	37/42	28/33	349/348	271/269	386/390	300/302
(Difference)	(+5)	(+4)	(-1)	(-2)	(+4)	(+2)
o Helicopter	74/85	55/63	340/328	252/243	414/413	307/306
(Difference)	(+11)	(+8)	(-12)	(-9)	(-1)	(-1)
Totals	569/681	410/491	813/790	611/593	1382/1471	1021/1084
	(+112)	(+81)	(-23)	(-18)	(+89)	(+63)
Naval Flight Officers						
o Radar Int. Off.	122/153	68/85	0/0	0/0	122/153	68/85
(Difference)	(+31)	(+17)	(0)	(0)	(+31)	(+17)
o Attack Nav.	224/281	126/158	15/15	8/9	238/296	134/167
(Difference)	(+57)	(+32)	(0)	(-1)	(+57)	(+33)
o ATDS Off.	61/72	40/48	0/0	0/0	61/72	40/48
(Difference)	(+11)	(+8)	(0)	(0)	(+11)	(+8)
o Navigator	0/0	0/0	270/251	189/176	270/251	189/176
(Difference)	(0)	(0)	(-19)	(-13)	(-19)	(-[illegible]
Totals	407/506	234/291	285/266	197/185	692/772	431/4[illegible]
	(+99)	(+57)	(-19)	(-12)	(+80)	(+45)

half of the total increase in training rate is in the Strike (Jet) Training Pipeline. This is the most costly pipeline by far. The per capita cost of the increased undergraduate training will therefore be significantly higher than the current average cost per graduate.

As with any model, the results obtained above suggest other alternatives which should be examined. In an actual planning scenario, the user would undoubtedly want to examine the impact of variations in subcommunity retention on the outcome. Upward detailing constraints could also be tested. The planner can even examine the impact of varying squadron grade structure, aircraft per squadron, or seat factor in order to assess the impact of short term resource constraints on the long term Aviation Officer inventory.

A word of advice to the potential user is in order at this point. The Aviation Officer Requirements Model places a large number of parameters under user control. If the user changes many parameters in a single run, he may have difficulty interpreting the results. To avoid this, the following approach to model utilization is recommended, based on experience gained on more than a hundred model runs:

- Establish a baseline run for comparison purposes. The default parameter settings approximate FY 81 requirements.
- Change no more than a half dozen parameters from run to run.
- Have a plan of attack. Take a few minutes to outline a sequence of runs before going on the computer. This saves times and minimizes rerun requirements.

For user convenience, runs are marked with the date and time of completion in the upper right hand corner of each sheet. The frequent user eventually will find this feature useful in organizing the data. The four runs used in the discussion of the 12 to 14 Air Wing force level change produced 54 pages of printout. The total time to complete the four runs was one hour and three minutes.

C. GRADE STRUCTURE ANALYSIS

Requirements are basically billet-by-billet statements of Navy needs. Inventory development is dominated by loss rates that are largely determined by factors exogenous to the Navy. Given those facts, it is not surprising that inventory and requirements seldom match exactly at the grade level of detail. Occasionally, after a period of extremely high or extremely low retention for example, it may be necessary to correct the imbalances by either adjusting requirements grade levels or modifying inventory grade distribution (by changing promotion flow points). The Aviation Officer Requirements Model can be used as an analytic tool in support of this process.

The model outputs which provide a measure of grade imbalance are the upward detailing fills and the Out-Of-Aviation flows. The model reports lower grade fills and the number of Out-Of-Aviation fills by grade level for each subcommunity. The model resorts to upward detailing only when it cannot employ source flow in the current tour at maximum flow.

Out-Of-Aviation flow is employed only when flow cannot be employed within aviation, either because requirements have been met or upward detailing limits have been achieved. In either case, the existence of such flows indicates a surplus of inventory over grade level requirements.

To illustrate this application, Table V reproduces output data for the Light Attack and Fighter Subcommunities from the runs produced in the preceding example.

TABLE V

UPWARD DETAIL AND OUT OF AVIATION FLOWS (LIGHT ATTACK AND FIGHTER NAVAL AVIATORS)

		Grade			
Subcommunity	LT	LCDR	CDR	SEN CDR	TOTAL
Light Attack					
Number Up Detailed to	-	52	0	0	
Out-Of-Aviation	41	20	0	13	74
Fighter					
Number Up Detailed to		5	0	0	
Out-Of-Aviation	0	0	0	11	11

Note: Base-Line Case (12 Air Wings)
Retention = 45%

In the case of Light Attack, a total of 93 surplus Lieutenants occurred, of which 52 were upward detailed within the 20 percent constraint. The remaining 41 were flowed to Out-Of-Aviation. The indication here is that converting 52 billets at the LT Level to LCDR-CDR billets would provide a better grade match. Additionally, if CDR billet requirements could be reduced, the lower grade surpluses would also be reduced, thus decreasing Out-Of-Aviation flow. Alternatively, moving the promotion flow point to LCDR forward (earlier) would achieve the same effect.

In the case of the Fighter Subcommunity, a total of nine lower grade fills were used at the LCDR and CDR levels indicating a near perfect inventory-requirements match.

D. RETENTION ANALYSIS

The role of projected retention rates for Aviation Officers in determining inventory projections has already been discussed. Clearly, retention is a key model variable. Since retention is not under Navy control, the planner is required to use estimates which are largely based on history but which hopefully take cognizance of the sociological and economic phenomena known to influence retention. Above all, the planner should recognize the sensitivity of model results to retention and perform the required sensitivity analysis. The following example illustrates this point.

The retention values used earlier in this section for the baseline case (B. Force Level Variations) were 45 percent for fixed wing aviators, 50 percent for rotary wing aviators, and 55 percent for Naval Flight Officers. These estimates assume that historical differences in retention between these Aviation Officer groups will persist, and that there will be a modest recovery in retention rates from the very low levels experienced in the late 1970s. In the 1984 Manpower Requirements Report submitted by the Office of the Secretary of Defense to the Congress in February 1983, Navy estimates of current retention are provided, and steady state retention goals for Aviation Officers are established at 55 percent for Naval Aviators and 60 percent for Naval Flight Officers.15/ Table VI compares the model output for the baseline case described previously and that obtained using the Manpower Requirement Report (MRR-84) steady state retention values.

Table VI shows that the model produces essentially the same inventory for both cases. However, the grade distribution is significantly different. The MRR-84 case contains 327 fewer Lieutenants, 148 more Lieutenant Commanders, and 183 more Commanders. Thus, compensation costs would be somewhat higher at the MRR-84 retention figures (About 4.5 m/year RMC in FY 83 dollars).

15/U.S. Department of Defense, Military Manpower Report to the Congress, February 1983, p. IV-13.

TABLE VI

BASELINE VS. MRR-84 RETENTION

CASE	CLASS	Grade Distribution LT	LCDR	LDR	TOTAL	Training Rate	Out Of Aviation
BASELINE CASE	NA	6728	1844	2325	10907	1020	1007
	NFO	2920	885	1067	4872	432	887
	TOTAL	9648	2729	3392	15779	1452	1894
MRR-84 CASE	NA	6491	1973	2470	10934	960	1097
	NFO	2830	904	1105	4839	414	879
	TOTAL	9321	2877	3575	15773	1374	1976
DIFFERENCE	NA	-237	+129	+145	+27	-60	+90
	NFO	- 90	+ 19	+ 38	-33	-18	- 8
	TOTAL	-327	+148	+183	- 6	-78	+98

However, this increase would be more than offset by the reduced accession training rates associates with the MRR-84 case. The higher retention results in a reduction of 60 in the Pilot Training Rate and 18 in the Naval Flight Officer Training Rate. The annual savings in military personnel costs associated with training at these lower levels total 6.3 M.

A review of other model parameters on a subcommunity-by-subcommunity basis reveals the following:

- First tour lengths increase due to the smaller entry cohort size. The change is about 3 months for Naval Aviators and 1 month for Naval Flight Officers.
- Command opportunity decreases slightly for Naval Aviators due to the larger number of Commanders. Naval Flight Officer command opportunity decreases much less because the retention differential between the two cases is smaller.
- ACIP Gate I projections generally increase by about 2 percent indicating more cockpit employment time across the board.

Overall, the conclusion is that increased retention would significantly lower costs, and in addition, provide a more manageable inventory of Aviation Officers.

E. A WORD OF CAUTION

The foregoing examples have been presented to illustrate, to potential users of the Aviation Officer Requirements Model, some ways in which the model can be useful as a planning tool. The model is admittedly complex. It must be if it is to reasonably represent the universe with which the planner must cope. Unfortunately, complexity, while conferring a degree of versatility, also demands a higher level of intellectual involvement on the part of the user. First of all, he must understand the reality that the model represents. He must then be prepared to expend considerable mental effort in interpreting model results in the context of that external reality. In a word, the planner must learn to use the tool. The foregoing examples were presented solely in the interest of facilitating that learning process. It would be a mistake to attach any great significance to the numerical results. The baseline case represents Aviation Officer requirements in 1981. A number of significant changes in force structure and support concepts have occurred since then which would alter the numerical results for the baseline case. Before attempting to employ the model in the planning process, the basic requirements arrays in the model should be respecified to reflect the current Aviation Officer billet structure, and the validity of certain force level parameters--most notably crew factors--should be confirmed.

V. APPLICATION OF THE MODELING TECHNIQUE TO THE SURFACE WARFARE OFFICER COMMUNITY

A. INTRODUCTION

A natural extension of the current effort to develop and implement an analytical tool for determining Naval Aviation Officer requirements is the application of the basic modeling technique to other officer communities. A preliminary analysis of the Surface Warfare Officer Community was conducted to identify any significant changes to the basic model structure that would be required. These changes are discussed in this section in terms of their influence on the model requirements specification, inventory specification, and career path specification.

B. REQUIREMENTS SPECIFICATION

The basic force element for Surface Warfare Officers is the individual ship. In specifying direct force level requirements, ships may be grouped by class to identify units with similar officer manpower requirements. These groups are then analogous to the subcommunities established in the Aviation Officer Requirements Model. In addition, ship classes may be grouped into ship types (e.g., DD-TYPE/DD 963-CLASS). There is some utility inherent in accomodating both type and class in the requirements structure of a Surface Warfare Officer Model. For example, the user may desire to specify force level changes in terms of class (e.g., add 5 DD963s) or type (Add 5 DDs). In the latter case, model logic would make additions to the latest (highest numbered) class in the type group, while losses would be taken from the oldest class.

While the ship class in the case of Surface Warfare Officers is analogous to aircraft type in the Aviation Officer Requirements Model, there does not appear to be any need to establish a subcommunity structure for the Surface Warfare Officer Model. Movement of Aviation Officers between subcommunities is infrequent--a fact which tends to focus manpower management on the weapon system type. On the other hand, Surface Warfare Officers move freely between classes and types so that, while class and type are important to requirements specification, there is no need for independent processing of subcommunities. Therefore, there would be no subdivisions of the Surface Warfare Officer community.

The Aviation Officer Requirements Model partitions requirements into four grade levels: LT, LCDR, CDR, SENIOR CDR). Two changes would be required in a Surface Warfare Officer Model.

- The grade of Captain (06) would be added. Aviation Officer requirements, by definition, include only Commanders and below. On the other hand, Surface Warfare Officer requirements include the grade of Captain. This grade would replace the artificially-created grade of Senior Commander.
- At the lower end of the grade scale, the LT and below category would be divided to separate Lieutenants from LTJG and below. Aviation Officers receive entry level training in a separate undergraduate training activity and become manpower resources upon designation at the completion of that training. Undergraduate training can thus be treated as a single network source for both inventory and requirements specification. Surface Warfare Officers proceed from initial training to a shipboard assignment. However, they are not designated Surface Warfare Officers until an initial qualification period aboard ship has been completed. This means that significant numbers of junior shipboard billets are filled by undesignated general line officers. Division of the lower grade requirement will provide a means of accounting for this phenomenon. The division is proposed at the LTJG rather than the Ensign level because a review of several ship manning documents revealed that there probably were not enough Ensign billets specified in requirements documents to permit accounting for all of the undesignated fills likely to occur at normal personnel flows. It is recognized that some allocation rule will have to be defined to segregate undesignated from designated Lieutenants Junior Grade.

A Surface Warfare Officer Model would specify requirements at five grade levels:

- Lt JG and Ensign
- Lieutenant
- Lieutenant Commander
- Commander
- Captain

C. INVENTORY SPECIFICATIONS

The fundamental shape of the officer inventory curve as a function of years of service will be the same for Surface Warfare Officers as for Aviation Officers. The shape will be specified by a continuation vector reflecting the year-to-year changes in Surface Warfare Officer inventory. This will also be linked to a retention specification. Differences in detail will be evident as follows:

- The time axis will specify years of commissioned service rather than years since designation.
- Captains will not leave the inventory. Therefore the sharp break evident at roughly the 20 year point will be reduced since it will reflect only early retirements
- Because of the inclusion of Captains in the inventory the model time frame will be extended to 30 years.
- Unrestricted Line Officer (11XX) continuation rates will have to be adjusted to reflect Surface Warfare (1110) continuation. Because of the nature of the accession process, decribed above, a Surface Warfare continuation vector may show continuation rates greater than unity in the early years of commissioned service.

D. CAREER PATH NETWORK

The major changes in the career path network for Surface Warfare Officers will be the extension in time covered to a nominal ten tours and the redefinition of activities represented. The increased number of tours results from the addition of Captains to the inventory at the senior end of the time scale and the addition of pre-designation commissioned time at the junior end. The definition of activities depends on analysis of Surface Warfare Officer career paths and the significance of career path considerations as constraints on the manpower planner. The definitions suggested in this Section are highly tentative, being based for the most part on discussions with experienced Surface Warfare Officers. It may well be that detailed analysis of the Surface Warfare Officer Billet Structure and detailing patterns will suggest alternative activity definitions. In view of the fact that the Surface Warfare designation is only a little more than ten years old, an analysis of this type is an obvious first step in the actual construction of a model.

The primary reason for including career path constraints in a requirements model is to ensure that plans based on that model account for the need to develop certain skills and experience levels in the inventory over time. The specification of a billet title and grade level generally implies the existence in the inventory of personnel with a fairly explicit set of skills gained in past assignments. Thus, personnel assignment has two objectives: the filling of immediate requirements and the development of the inventory so that future requirements can also be met. A useful planning tool must account for both of these objectives.

The Aviation Officer Requirements Model accounted for skill/experience requirements in two ways: First, set of general background requirements are defined by the seven activity definitions. Second, more explicit set of warfare skills are implicit in the 23 defined subcommunities. For example, a body of expertise in Anti-Air Warfare is established in the definition of the VF (Fighter) and Early Warning (VAW) Subcommunities. Since subcommunities are not envisioned for a Surface Warfare Officer Model, it was necessary to accommodate some specific skill/experience identifiers in the activity definitions of the career path network.

Surface ships in the Navy can be placed in one of three categories depending on their fundamental mission. These are:

- Fleet Combatants
- Amphibious Ships
- Fleet Auxiliaries

There are specialized skills associated with the operation and handling of ships in each of these categories. It is important that the Surface Warfare Officer inventory contain officers with experience in each of these mission areas. Therefore, they are specified as separate Surface Warfare Officer Activities governing both requirements partitioning and inventory distribution.

The three activities identified above correspond to the Fleet Squadron Activity of the Aviation Officer Requirements Model; that is, Aviation Officers are primarily needed to operate fleet aircraft and Surface Warfare Officers are primarily needed to operate fleet ships. Subdividing the activity in the case of Surface Warfare Officers makes the structure of the requirement visible, and in addition, provides the opportunity for a degree of user control. In specifying network arcs, the user can either permit or inhibit flow between these activities.

Arc capacity constraints can also be employed to limit flows between activities. In fact, the user will have available a range of options from completely free flow between activities to complete isolation of activities. The first extreme would represent the way the Surface Warfare Officer community is managed, while the second would approximate the subcommunity structure of the Aviation Officer Requirements Model.

In addition to ship's company assignments, Surface Warfare Officers are also required on afloat staffs. This Afloat Activity corresponds to the

Afloat Assignments Activity of the Aviation Officer Requirements Model.

The fifth activity identified for the Surface Warfare Officer Requirements Model is Professional Training. This is intended to make visible the significant training provided by Surface Warfare Officer schools at the department head and command level. It is envisioned that the model would implicitly specify flows to this activity as a function of flows to shipboard billets.

The remaining two activities proposed for the Surface Warfare Officer Requirements Model, Professional Education and Other, are identical to those defined for the Aviation Officer Requirements Model.

In summary, seven career activities are proposed for a Surface Warfare Officer Requirements Model:

- Fleet Combatants
- Amphibious Forces
- Fleet Auxiliaries
- Professional Training
- *Afloat Staffs*
- Professional Education
- Other

Figure 4 is an example of a Surface Warfare Officer career path network. The arcs selected show all source flow going to activities 1-3 for the first tour. These flows then divide between Professional Education and OTHER for a second tour which is assumed to be ashore. These in turn, divide for the third tour covering all possible destination activities. Beyond the third tour no attempt is made to portray all possible arcs, instead, typical flows to shipboard department head and command tours are depicted. It is important to note that the three year tour length depicted in the diagram is nominal. The model user would have the capability of specifying the actual tour length in months, for every model destination node.

The analysis of the Surface Warfare Officer community, while tentative with respect to some fairly important details, demonstrates the feasibility of implementing a Surface Warfare Officer Requirements Model that is functionally similar to the Aviation Officer Requirements Model. The major changes required are elimination of the subcommunity structure and redefinition of career activities. Other changes might be necessary after detailed analysis of the Surface Warfare Officer billet structure, but based on experience with the Aviation Officer Requirements Model, such changes should be minor in nature. Overall, the model would be somewhat less complicated than the Aviation Officer Model and require significantly shorter execution time on the computer.

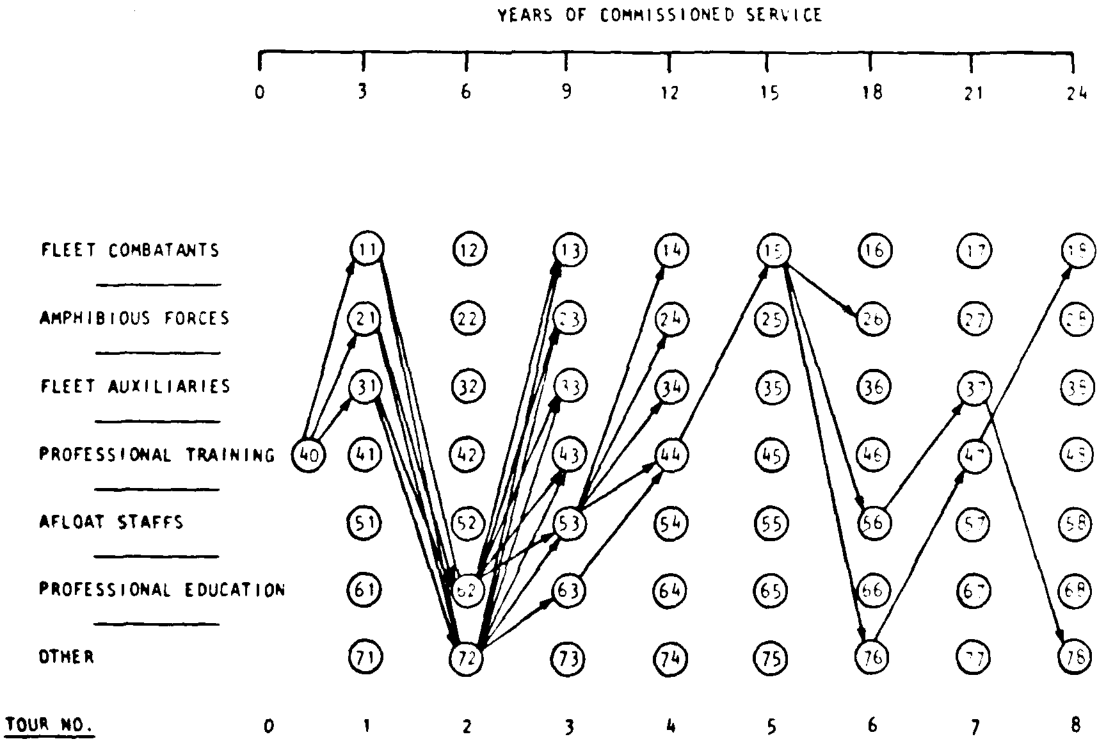
YEARS OF COMMISSIONED SERVICE
0
3
6
9
12
15
18
21
24
FLEET COMBATANTS
AMPHIBIOUS FORCES
FLEET AUXILIARIES
PROFESSIONAL TRAINING
AFLOAT STAFFS
PROFESSIONAL EDUCATION
OTHER
TOUR NO.
0
1
2
3
4
5
6
7
8

FIGURE 4

SURFACE WARFARE OFFICER CAREER PATH NETWORK

VI. CONCLUSION

Previous sections of this report have attempted to achieve three main goals:

- Describe the process by which manpower requirements are determined in the context of the Planning, Programming, and Budgeting process by which personnel resources are obtained. The central theme of that discussion was the contrast between the potential long term consequences of manpower decisions and the relatively short planning horizon of the PPBS.
- Describe a planning tool, the Aviation Officer Requirements Model, which allows consideration of both the long and short term consequences of manpower decisions in the planning process.
- Demonstrate some ways in which the model can be applied as a planning tool. The model is necessarily complex. An understanding of Aviation Officer manpower requirements on the part of the user is presumed. However, no computer expertise is required. It is a menu driven, "user friendly" model.

In addition, the general applicability of the basic modeling technique to other officer communities has been demonstrated by developing the basic outline of a *Surface Warfare Officer Requirements Model*.

A final word of stress on a point repeatedly made in this report: the Aviation Officer Requirement Model is a tool. Hammers and saws do not build houses, carpenters do; computer programs do not make plans, planners do. Good planners, like good carpenters, are distinguished by the skill with which they use their tools.

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APPENDIX A

AVIATION OFFICER REQUIREMENTS MODEL

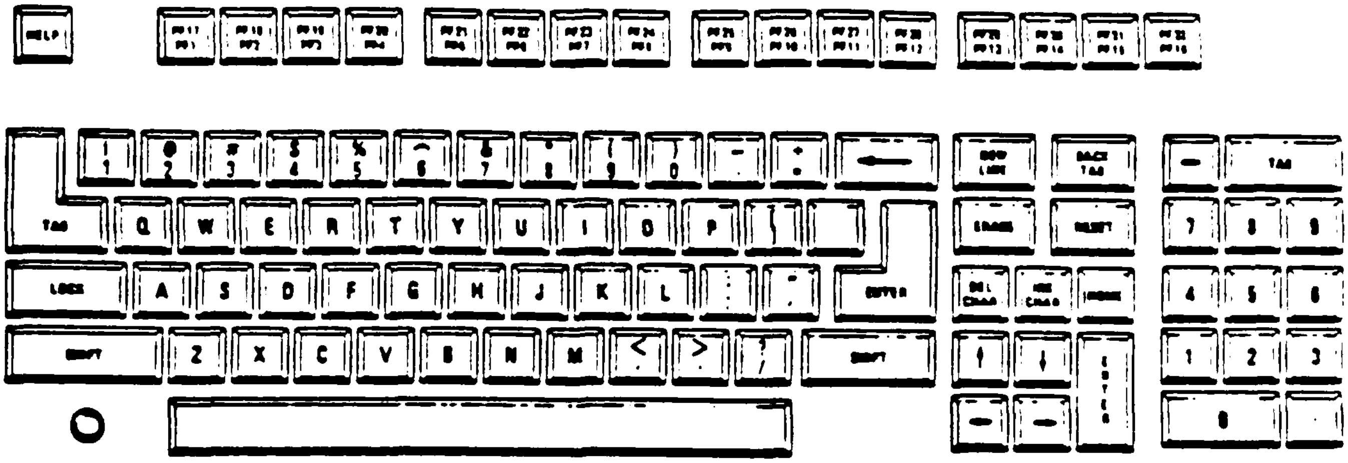
USER'S GUIDE

The objective of this appendix is to provide non-ADP personnel with the information necessary to effectively use the Aviation Officers Requirements Model.

The Aviation Officers Requirements Model provides an automated capability to effectively deal with officer requirements determinations through interactive, user-friendly processing.

The user of the Aviation Officer Requirements Model must know how to initiate and stop computer processing as well as how to use the system to produce useful results. This appendix is presented in such a way as to walk the user through the system from start to finish and provide an example to every screen or option possible. Use of this appendix should make the Aviation Officer Requirements Model easy to operate for all personnel. While the model is designed for personnel with limited computer experience, it is assumed that users are familiar with the Aviation Officer Requirements Determination process.

On the next page of this appendix is a picture of the computer keyboard and a brief explanation of the user entry keys, which are used for the majority of the interactions in the Aviation Officer Requirements Model. An explanation of the cursor control keys and parameter definitions are also provided.



THE KEYBOARD

I. SPECIAL KEYS

1. ENTER key	- The normal means of terminating user entry and requesting the program to process data. SHIFT does not affect the action of ENTER, and ENTER is not honored while the keyboard data entry keys are locked.
2. PF key (Program Function)	- Most command options in response to screen menus are entered by use of the PF keys. The values of the 16 PF keys are affected by the SHIFT key. Thus there are 32 Program Functions keys. Next to the description of each option on the display is the number of one of the PF keys. Command options are entered by pressing the appropriate PF key.

- NOTE -

All keys have the capability of being turned off or on. When the user is asked to make a PF or "ENTER" key selection, only those keys are turned on. If an off key is pressed, the workstation alarm will sound as a warning that an invalid key was pressed and another key selection should be made.

II. CURSOR CONTROL KEYS

1. TAB key - Many screens present predefined fields in which entries can be made. By using the "TAB" key the cursor jumps only to those predefined fields freeing the user from having to count spaces.

2. ARROW keys - There are four directions the user can move the cursor: up, down, right and left. These arrow keys position the cursor without regard for the presence of predefined fields. They can position the cursor at any location on the screen and provide automatic repeat for as long as the key is pressed. All keys also have a wraparound feature. For example, if the cursor is positioned in the top row, and the user presses the up arrow, the cursor moves to the bottom row in the same column.

III. PARAMETERS

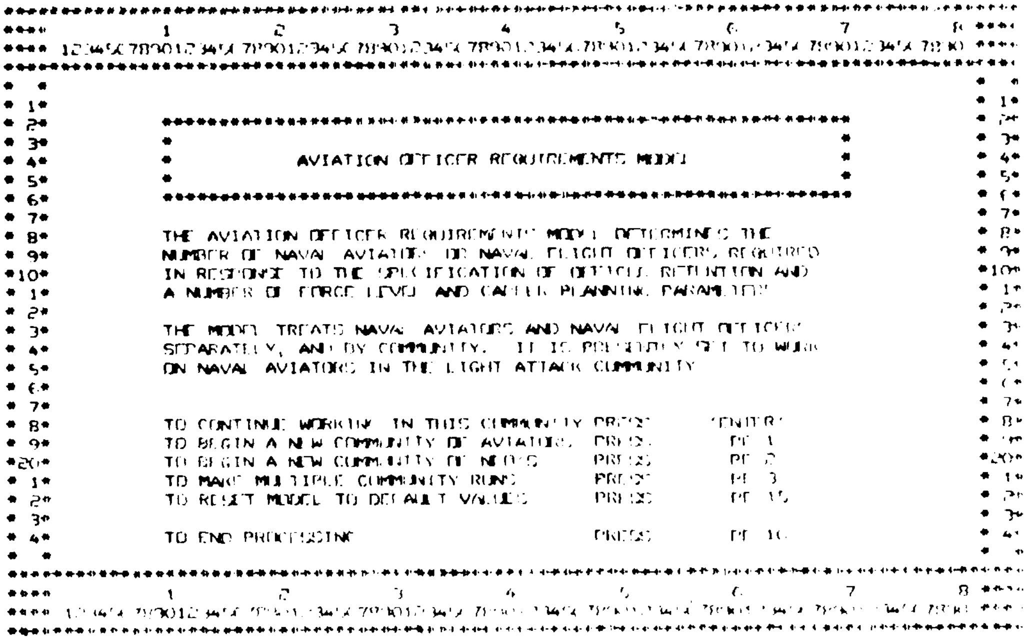
1. Defined (on screen) - Most parameters are set initially to default values (See default values) and the user can either change them to suit his purpose or continue using those values. To change a parameter value, position the cursor (cursor control keys) under the variable to be

changed, and then type over it. If the new variable is smaller than the previous variable, use the space bar to delete those extra characters.

2. Defined (off screen) - Some parameter fields initially appear with blanks, and the the user can enter parameter values in these fields. To make entries, position the cursor (via TAB key) and type in the information. If left blank, the model automatically uses default values.

3. Entering - Once parameters are set, the user should press "ENTER" unless otherwise specified. The cursor position is unimportant with regard to "ENTER", but make sure all parameters are correct before entering.

S1



```
              AVIATION OFFICER REQUIREMENTS MODEL

THE AVIATION OFFICER REQUIREMENTS MODEL DETERMINES THE
NUMBER OF NAVAL AVIATORS OR NAVAL FLIGHT OFFICERS REQUIRED
IN RESPONSE TO THE SPECIFICATION OF OFFICER RETENTION AND
A NUMBER OF FORCE LEVEL AND CAREER PLANNING PARAMETERS

THE MODEL TREATS NAVAL AVIATORS AND NAVAL FLIGHT OFFICERS
SEPARATELY, AND BY COMMUNITY.  IT IS PRESENTLY SET TO WORK
ON NAVAL AVIATORS IN THE LIGHT ATTACK COMMUNITY


TO CONTINUE WORKING IN THIS COMMUNITY PRESS     ENTER
TO BEGIN A NEW COMMUNITY OF AVIATORS  PRESS      PF 1
TO BEGIN A NEW COMMUNITY OF NFOS      PRESS      PF 2
TO MAKE MULTIPLE COMMUNITY RUNS       PRESS      PF 3
TO RESET MODEL TO DEFAULT VALUES      PRESS      PF 15

TO END PROCESSING                     PRESS      PF 16
```

COMMUNITY SECTIONS MENU SCREEN

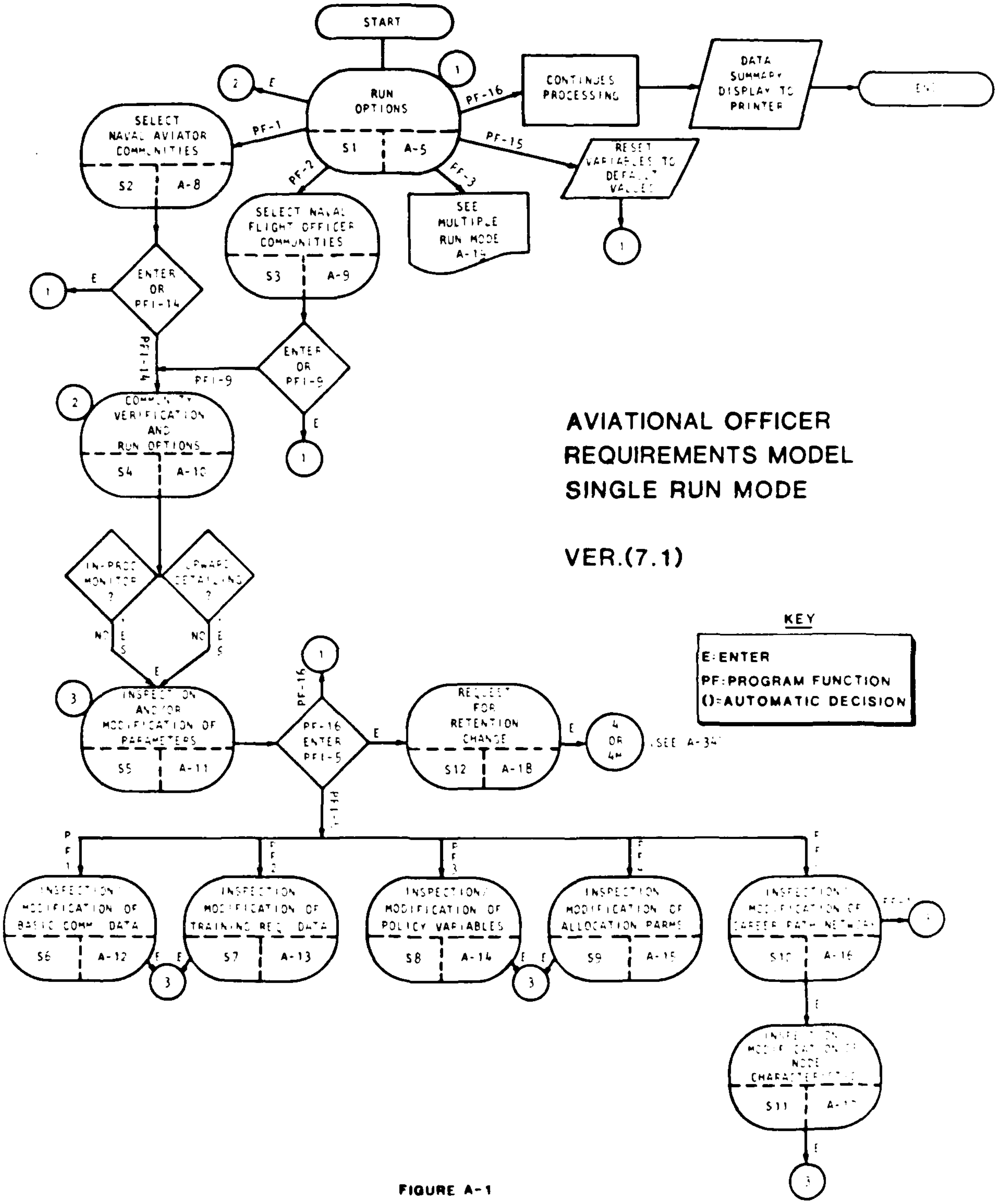
This screen acts as the Control Screen. It permits one to enter and exit the program. On entry to the program, the above display will be presented on the work station screen. Notice the words NAVAL AVIATOR and LIGHT ATTACK; they have been underlined in the above picture but will appear as flashing words on the display screen. These words flash to indicate the current model status. On entering the program, all variables are predefined to default values (see Appendix C).

The user has one of five Run options to choose from:

1) Continue working in the Community which appears flashing on the screen (see A-10).
2) Begin working in a new Community of AVIATORS. (See A-8)
3) Begin working in a new Community of NAVAL FLIGHT OFFICERS (NFOs) (see A-9).
4) Make multiple Community runs (see A-19).
5) End processing (Note - on command of End processing, which causes exit from the program, printed output from the program run will begin).

SINGLE COMMUNITY RUN

The following pages A-7 to A-18 explain and describe the screens in SINGLE COMMUNITY RUN processing. Figure A-1 of this section is a basic flow diagram showing the logical sequence of screens displayed in SINGLE COMMUNITY mode. The remainder of this section is devoted to a detailed description of each screen shown in the flow diagram.


START
RUN OPTIONS
S1
A-5
1
2
E
PF-16
CONTINUES PROCESSING
DATA SUMMARY DISPLAY TO PRINTER
END
PF-15
RESET VARIABLES TO DEFAULT VALUES
1
PF-3
SEE MULTIPLE RUN MODE A-14
PF-1
SELECT NAVAL AVIATOR COMMUNITIES
S2
A-8
PF-2
SELECT NAVAL FLIGHT OFFICER COMMUNITIES
S3
A-9
ENTER OR PF1-14
E
1
PF1-14
ENTER OR PF1-9
PF1-9
E
1
2
COMMUNITY VERIFICATION AND RUN OPTIONS
S4
A-10
IN-PROC MONITOR ?
UPWARD DETAILING ?
NO
YES
NO
YES
E
3
INSPECTION AND/OR MODIFICATION OF PARAMETERS
S5
A-11
PF-16
1
PF-16 ENTER PF1-5
E
REQUEST FOR RETENTION CHANGE
S12
A-18
E
4 OR 4M
(SEE A-34)
PF1-5
PF1
PF2
PF3
PF4
PF5
INSPECTION/ MODIFICATION OF BASIC COMM. DATA
S6
A-12
E
E
3
INSPECTION MODIFICATION OF TRAINING REQ. DATA
S7
A-13
INSPECTION/ MODIFICATION OF POLICY VARIABLES
S8
A-14
E
E
3
INSPECTION MODIFICATION OF ALLOCATION PARMS
S9
A-15
INSPECTION/ MODIFICATION OF CAREER PATH NETWORK
S10
A-16
PF-4
E
INSPECTION/ MODIFICATION OF NODE CHARACTERISTICS
S11
A-17
E
3

AVIATIONAL OFFICER
REQUIREMENTS MODEL
SINGLE RUN MODE

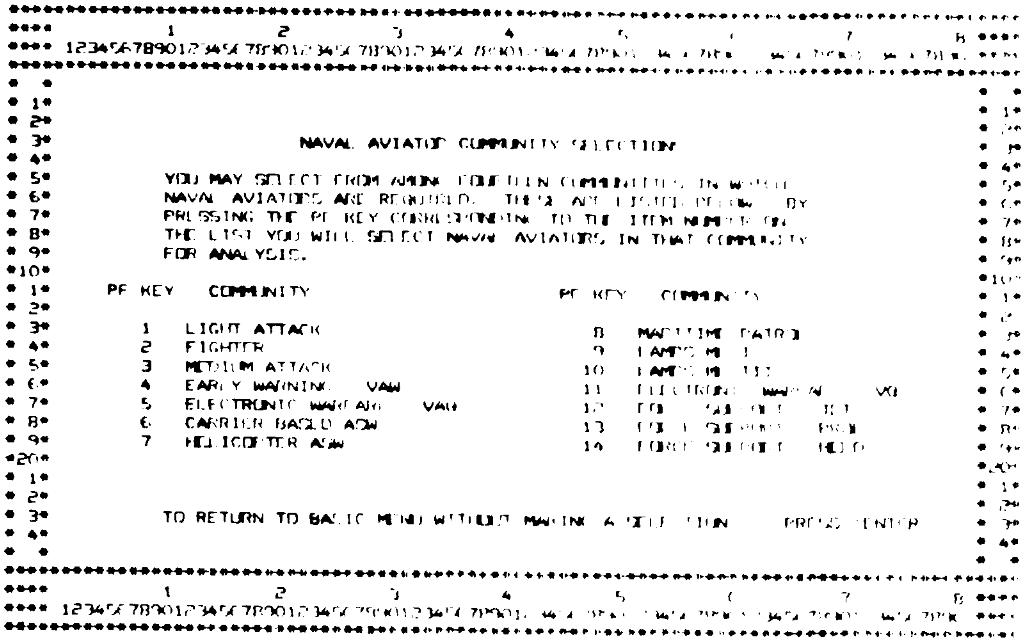
VER.(7.1)

KEY

E:ENTER
PF:PROGRAM FUNCTION
():AUTOMATIC DECISION

FIGURE A-1

S2

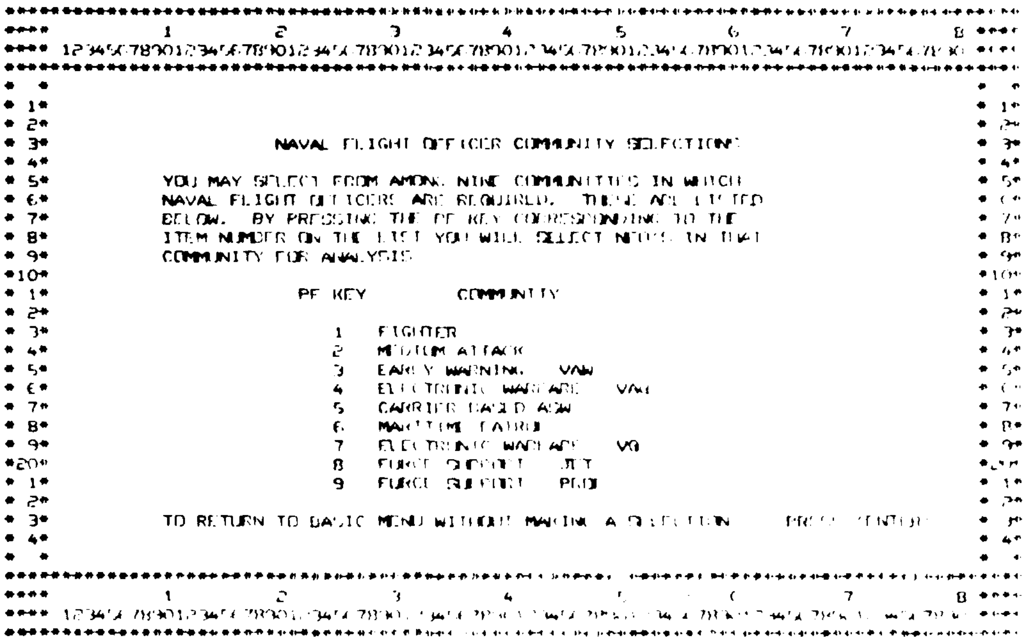


```
                  NAVAL AVIATOR COMMUNITY SELECTION

        YOU MAY SELECT FROM AMONG FOURTEEN COMMUNITIES IN WHICH
        NAVAL AVIATORS ARE REQUIRED.  THESE ARE LISTED BELOW.  BY
        PRESSING THE PF KEY CORRESPONDING TO THE ITEM NUMBER ON
        THE LIST YOU WILL SELECT NAVAL AVIATORS IN THAT COMMUNITY
        FOR ANALYSIS.

   PF KEY   COMMUNITY                          PF KEY   COMMUNITY

     1   LIGHT ATTACK                            8   MARITIME PATROL
     2   FIGHTER                                 9   LAMPS MK I
     3   MEDIUM ATTACK                          10   LAMPS MK III
     4   EARLY WARNING    VAW                   11   ELECTRONIC WARFARE    VQ
     5   ELECTRONIC WARFARE    VAQ              12   FORCE SUPPORT   JET
     6   CARRIER BASED ASW                      13   FORCE SUPPORT   PROP
     7   HELICOPTER ASW                         14   FORCE SUPPORT   HELO


        TO RETURN TO BASIC MENU WITHOUT MAKING A SELECTION      PRESS ENTER
```

NAVAL AVIATION COMMUNITY SELECTION MENU SCREEN

By pressing the PF-1 key when the Community Selection Screen (S1) is displayed, the above screen (S2) will appear. This screen allows the user to select one of 14 Subcommunities in which NAVAL AVIATORS are required. By pressing one of the 14 PF-keys, the user will enter that corresponding Subcommunity for analysis. By pressing the "Enter" key, the user will return to the Community Selection Screen (S1) without altering the current subcommunity selection.

S3



```
                 NAVAL FLIGHT OFFICER COMMUNITY SELECTIONS

        YOU MAY SELECT FROM AMONG NINE COMMUNITIES IN WHICH
        NAVAL FLIGHT OFFICERS ARE REQUIRED.  THESE ARE LISTED
        BELOW.  BY PRESSING THE PF KEY CORRESPONDING TO THE
        ITEM NUMBER ON THE LIST YOU WILL SELECT NFOS IN THAT
        COMMUNITY FOR ANALYSIS

                     PF KEY         COMMUNITY

                        1    FIGHTER
                        2    MEDIUM ATTACK
                        3    EARLY WARNING    VAW
                        4    ELECTRONIC WARFARE    VAQ
                        5    CARRIER BASED ASW
                        6    MARITIME PATROL
                        7    ELECTRONIC WARFARE    VQ
                        8    FORCE SUPPORT    JET
                        9    FORCE SUPPORT    PROP

        TO RETURN TO BASIC MENU WITHOUT MAKING A SELECTION      PRESS "ENTER"
```

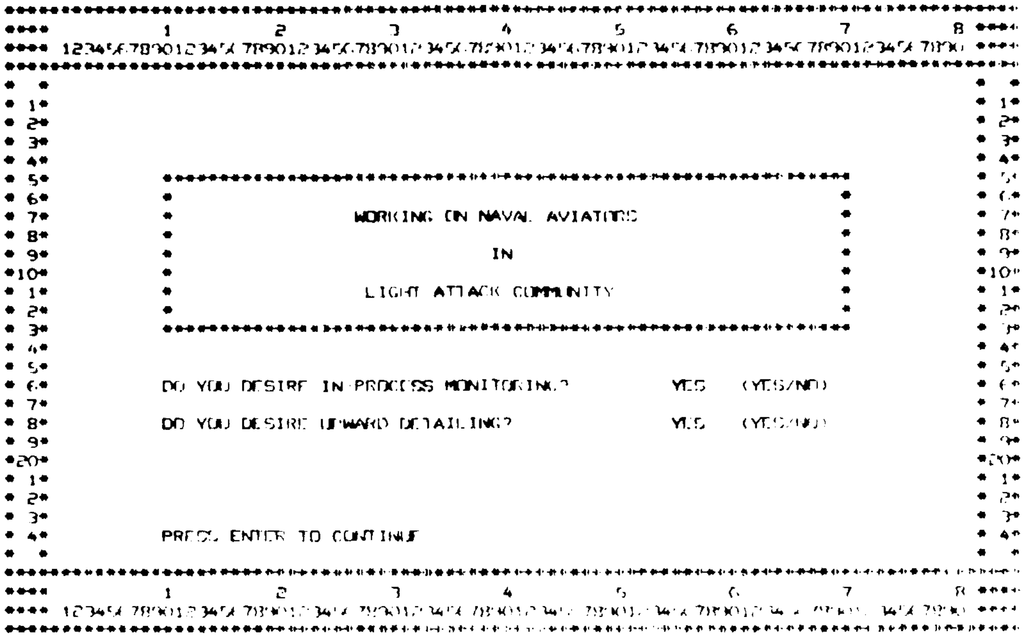
NAVAL FLIGHT OFFICER (NFO) COMMUNITY SELECTION SCREEN

If the user selected the PF-2 key while the Community Selection Screen (S1) appeared, the above screen will be displayed. This screen allows the user to select one of the nine Subcommunities in which NFOs are required. By pressing one of the nine PF-keys, the user will enter the corresponding Subcommunity for analysis. If the user wishes to return to the Community Selection Screen (S1), press the "ENTER" key.

- NOTE -

When returning to the Community Selection Screen (S1), the Community and Subcommunity, which appear flashing, indicate the current area for analysis.

S4



```
WORKING ON NAVAL AVIATORS

IN

LIGHT ATTACK COMMUNITY

DO YOU DESIRE IN-PROCESS MONITORING?     YES   (YES/NO)

DO YOU DESIRE UPWARD DETAILING?          YES   (YES/NO)

PRESS ENTER TO CONTINUE
```

COMMUNITY VERIFICATION AND RUN OPTIONS

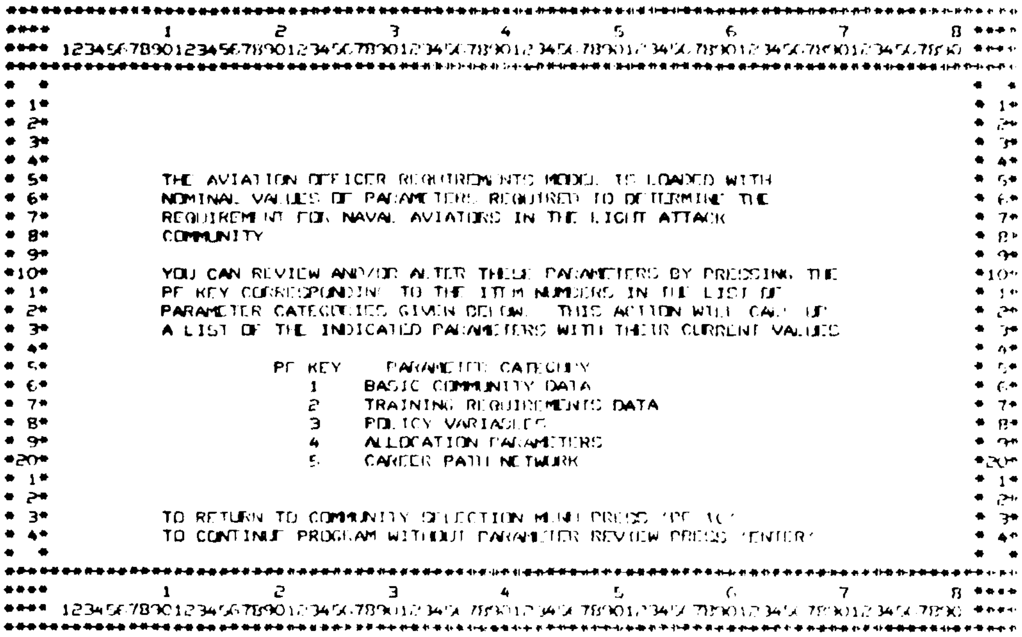
Screen S4 (above) identifies the Subcommunity the model is currently concerned with and allows the user to select run options. IN-PROCESS MONITORING allows the user to see intermediate results between iterations. The user may also run the system with minimal interaction by typing "NO" in place of "YES" for IN-PROCESS MONITORING.

UPWARD DETAILING allows the system to assign officers to requirements of the next higher grade when all requirements at the current grade level have been met. If the user doesn't want Upward Detailing, type "NO" in place of "YES".

-NOTE-

If the user initially entered "YES" for IN-PROCESS MONITORING, he will later have the option to change this status after every complete iteration.

S5

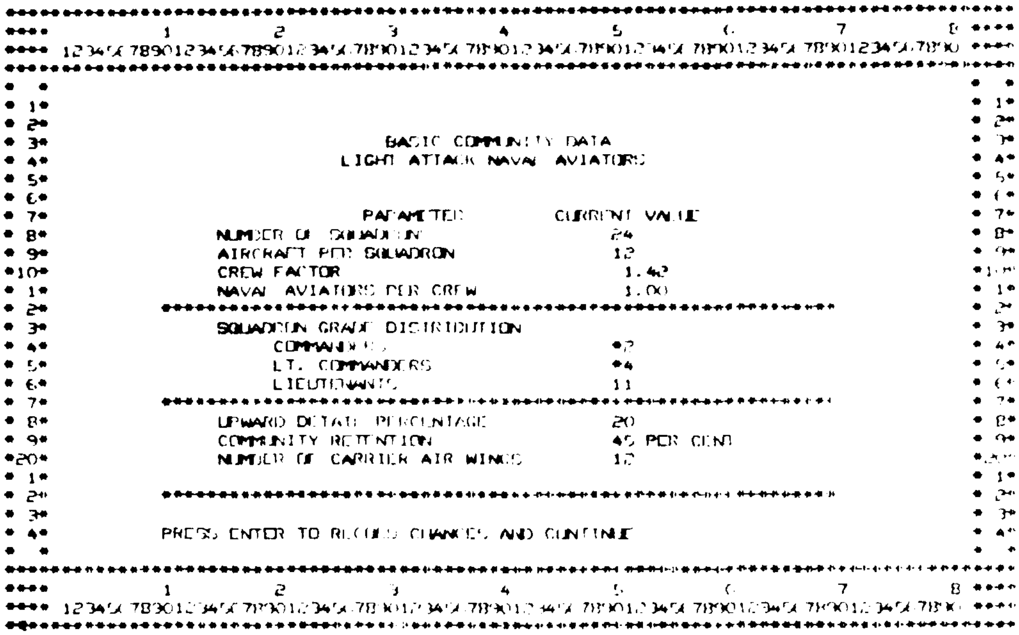


```
******************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
******************************************************************************************
*  *                                                                                  *  *
* 1*                                                                                  * 1*
* 2*                                                                                  * 2*
* 3*                                                                                  * 3*
* 4*                                                                                  * 4*
* 5*          THE AVIATION OFFICER REQUIREMENTS MODEL IS LOADED WITH                  * 5*
* 6*          NOMINAL VALUES OF PARAMETERS REQUIRED TO DETERMINE THE                  * 6*
* 7*          REQUIREMENT FOR NAVAL AVIATORS IN THE LIGHT ATTACK                      * 7*
* 8*          COMMUNITY                                                               * 8*
* 9*                                                                                  * 9*
*10*          YOU CAN REVIEW AND/OR ALTER THESE PARAMETERS BY PRESSING THE            *10*
* 1*          PF KEY CORRESPONDING TO THE ITEM NUMBERS IN THE LIST OF                 * 1*
* 2*          PARAMETER CATEGORIES GIVEN BELOW.  THIS ACTION WILL CALL UP             * 2*
* 3*          A LIST OF THE INDICATED PARAMETERS WITH THEIR CURRENT VALUES            * 3*
* 4*                                                                                  * 4*
* 5*                   PF KEY    PARAMETER CATEGORY                                   * 5*
* 6*                       1     BASIC COMMUNITY DATA                                 * 6*
* 7*                       2     TRAINING REQUIREMENTS DATA                           * 7*
* 8*                       3     POLICY VARIABLES                                     * 8*
* 9*                       4     ALLOCATION PARAMETERS                                * 9*
*20*                       5     CAREER PATH NETWORK                                  *20*
* 1*                                                                                  * 1*
* 2*                                                                                  * 2*
* 3*          TO RETURN TO COMMUNITY SELECTION MENU PRESS 'PF 16'                     * 3*
* 4*          TO CONTINUE PROGRAM WITHOUT PARAMETER REVIEW PRESS 'ENTER'              * 4*
*  *                                                                                  *  *
******************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
******************************************************************************************
```

PARAMETER CATEGORY MENU SCREEN

This screen appears after screen S5 and screens S8-S13. It allows the user to enter each of the five parameter categories in order to inspect and/or change existing parameters. To inspect any parameter category, select the corresponding PF-key. The user may also return to the Community Selection Menu Screen (S1) by pressing the PF-16 key. If the user wishes to bypass the parameter review he may do so by pressing the "ENTER" key.

S6

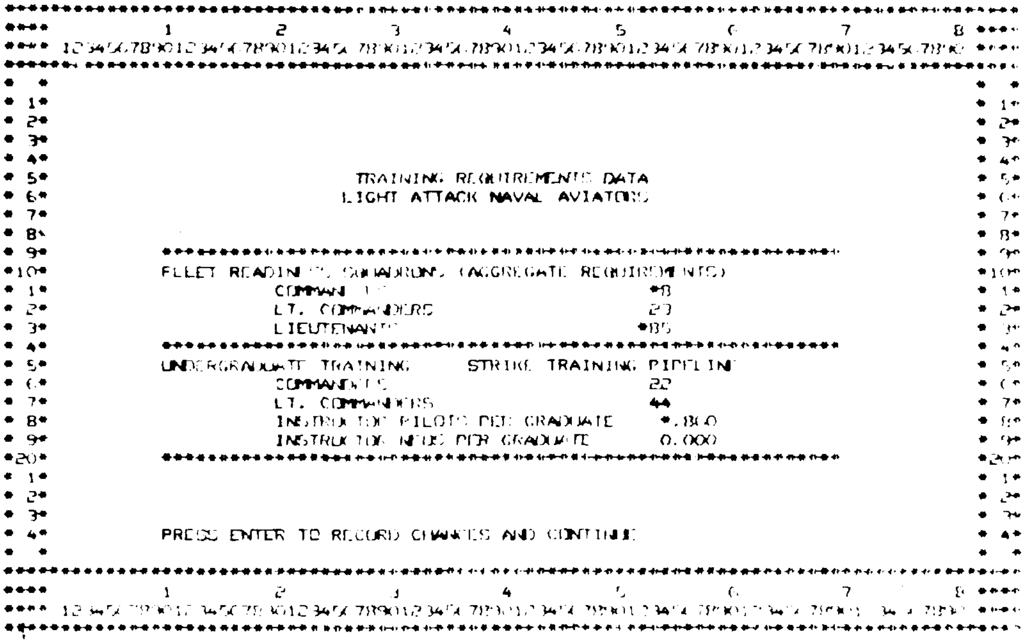


```
                    BASIC COMMUNITY DATA
                 LIGHT ATTACK NAVAL AVIATORS

                  PARAMETER          CURRENT VALUE
        NUMBER OF SQUADRON                24
        AIRCRAFT PER SQUADRON             12
        CREW FACTOR                        1.42
        NAVAL AVIATORS PER CREW            1.00
    ****************************************************
        SQUADRON GRADE DISTRIBUTION
             COMMANDERS                   *2
             LT. COMMANDERS               *4
             LIEUTENANTS                  11
    ****************************************************
        UPWARD DETAIL PERCENTAGE          20
        COMMUNITY RETENTION               45 PER CENT
        NUMBER OF CARRIER AIR WINGS       12

    ****************************************************

    PRESS ENTER TO RECORD CHANGES AND CONTINUE
```

BASIC COMMUNITY DATA SCREEN (PARAMETER REVIEW)

This screen displays the current value of basic parameters for the subcommunity being processed. The user may change one, none, or all existing parameters. The user should be aware that changes to the parameters CREW FACTOR and NAVAL AVIATORS PER CREW, will affect only the number of Lieutenants per squadron. The Commander and Lieutenant Commander parameters will remain unchanged. If Commander/Lieutenant Commander parameters are changed the adjustment of Lieutenant parameters is automatic and squadron grade distribution will conform to user specification. In order to record any changes and continue with the program, press "Enter". Upon doing so, the program will return to Screen S5 (Parameter Category Menu) allowing the user to make further changes or bypass the parameter review.

S7

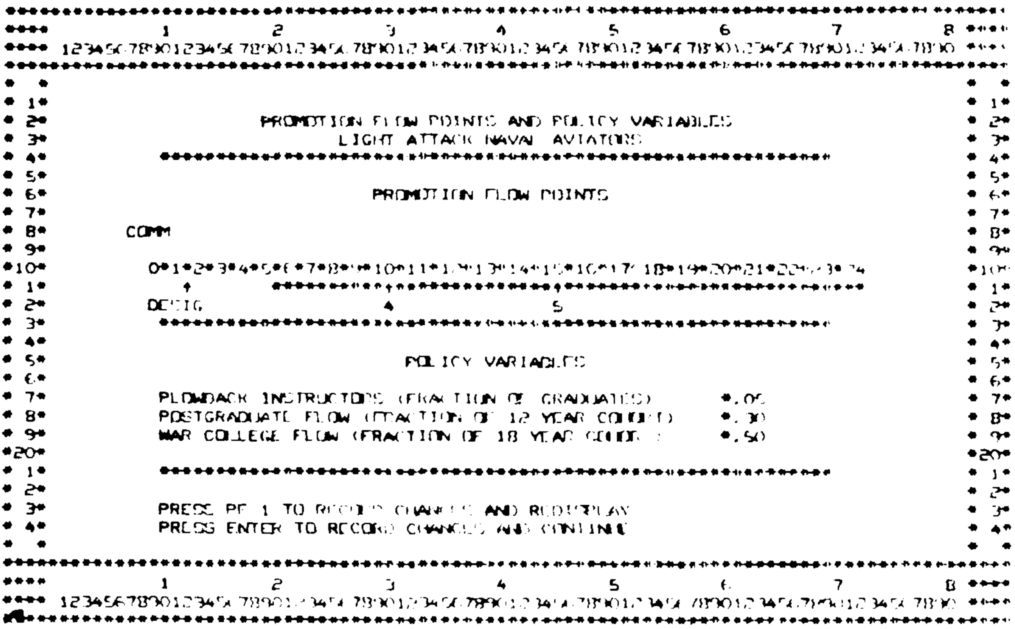


```
TRAINING REQUIREMENTS DATA
LIGHT ATTACK NAVAL AVIATORS

****************************************************
FLEET READINESS SQUADRONS (AGGREGATE REQUIREMENTS)
          COMMANDERS                        *8
          LT. COMMANDERS                    23
          LIEUTENANTS                      *85
****************************************************
UNDERGRADUATE TRAINING      STRIKE TRAINING PIPELINE
          COMMANDERS                        22
          LT. COMMANDERS                    44
          INSTRUCTOR PILOTS PER GRADUATE     *.800
          INSTRUCTOR NFOS PER GRADUATE       0.000
****************************************************

PRESS ENTER TO RECORD CHANGES AND CONTINUE
```

TRAINING REQUIREMENTS DATA SCREEN (PARAMETER REVIEW)

This screen displays the current value of the parameters within TRAINING REQUIREMENTS DATA. The user may change one, none, or all existing parameters to meet the necessary requirements. The user should be aware that the number of Lieutenants for undergraduate training is determined by the Instructor Planning Factors (Instructor Pilots per Graduates, Instructor NFOs per Graduate). In order to record any changes and continue with the program, press "Enter". Upon doing so, the program will return to Screen S5 allowing the user to make further changes or bypass the parameter review.

S8

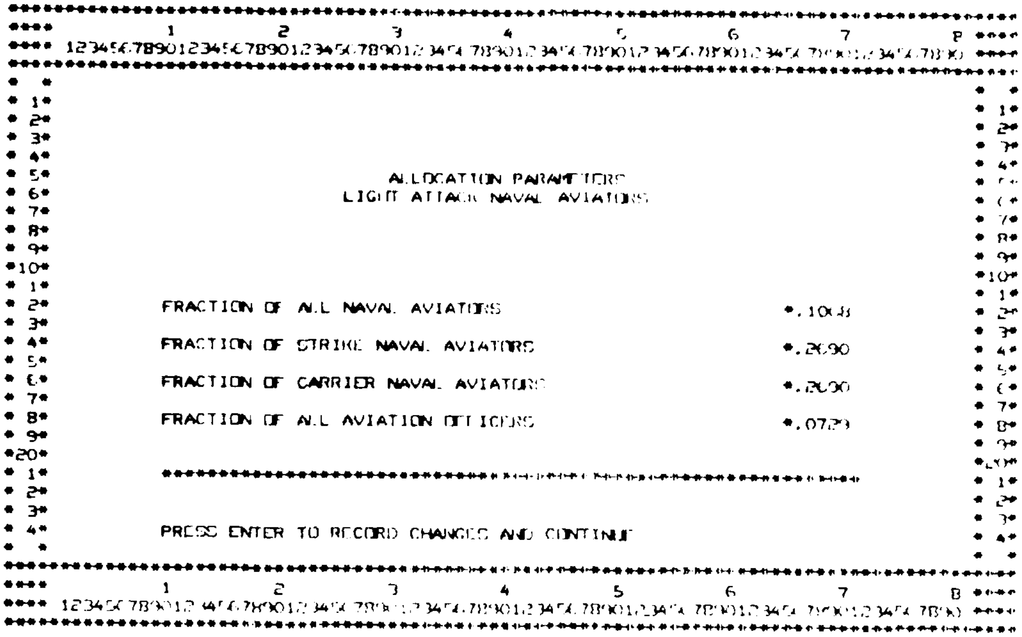


```
                    PROMOTION FLOW POINTS AND POLICY VARIABLES
                           LIGHT ATTACK NAVAL AVIATORS

                              PROMOTION FLOW POINTS

     COMM

       0*1*2*3*4*5*6*7*8*9*10*11*12*13*14*15*16*17*18*19*20*21*22*23*24
         ^
       DESIG                4               5

                                POLICY VARIABLES

        PLOWBACK INSTRUCTORS (FRACTION OF GRADUATES)        *.05
        POSTGRADUATE FLOW (FRACTION OF 12 YEAR COHORT)      *.30
        WAR COLLEGE FLOW (FRACTION OF 18 YEAR COHORT)       *.50

        PRESS PF 1 TO RECORD CHANGES AND REDISPLAY
        PRESS ENTER TO RECORD CHANGES AND CONTINUE
```

PROMOTION FLOW/POLICY VARIABLES SCREEN (PARAMETER REVIEW)

This screen allows the user to change both Promotion Flow Points and Policy Variables. The Promotion Flow Points section of this screen is a bargraph representing years of commissioned service. Up-arrows under the graph show the promotion flow points to the grades of Lieutenant Commander and Commander (4 for LCDR, 5 for CDR). To change promotion flow points, position the cursor under the desired number of years and enter the appropriate number (4 or 5). (Note that entries made with years consisting of two digits (i.e., 10), the number (4 or 5) may be placed under either digit.) Half year promotion flow points (i.e., 10.5 years) may be selected by positioning the entry under the asterisk between numbers. Also note that both entries (4 & 5) must be made if any change is made. If either entry is left out, the resulting promotion flow point parameters will be inaccurate.

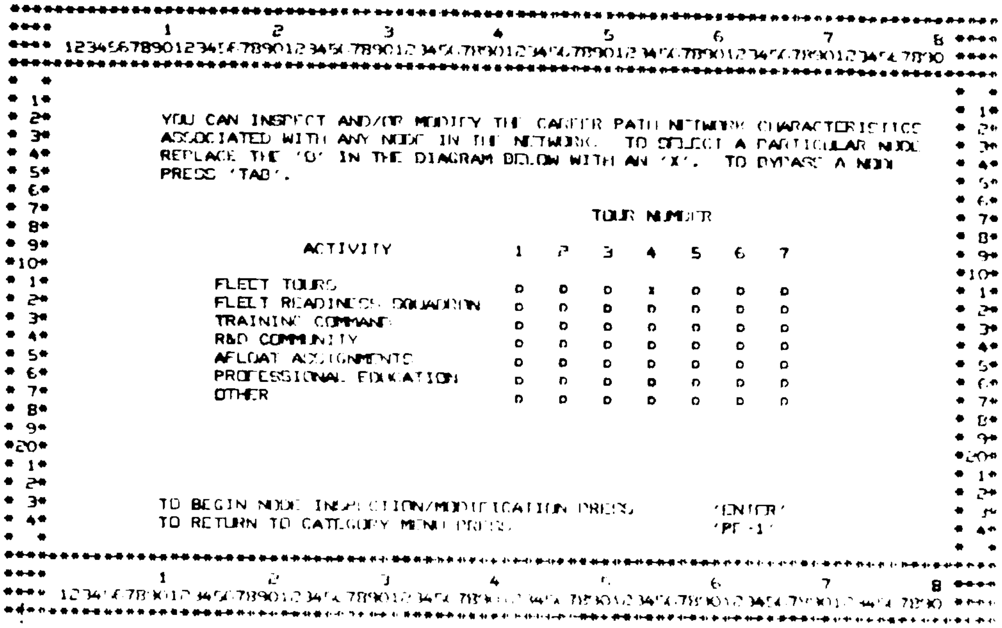
The Policy Variables section of this screen allows the user to enter different policy alternatives. PLOWBACK INSTRUCTORS are the fraction of training command graduates assigned immediately as instructors in undergraduate training. POSTGRADUATE FLOW is the fraction of the 12 year cohorts with a graduate level education. WAR COLLEGE FLOW is the fraction of 18 year cohorts with a war college education To record changes and redisplay variables press PF-1. To record changes and continue press "ENTER".



```
                    ALLOCATION PARAMETERS
                LIGHT ATTACK NAVAL AVIATORS


FRACTION OF ALL NAVAL AVIATORS                    *.1003

FRACTION OF STRIKE NAVAL AVIATORS                 *.2090

FRACTION OF CARRIER NAVAL AVIATORS                *.2090

FRACTION OF ALL AVIATION OFFICERS                 *.0729

**************************************************************

PRESS ENTER TO RECORD CHANGES AND CONTINUE
```

ALLOCATION PARAMETERS SCREEN (PARAMETER REVIEW)

This screen displays the ALLOCATION PARAMETERS which the model will use in assigning fractions of general Aviation Officer requirements to the Subcommunity under investigation. The user should note that a change to any allocation fraction will cause an automatic adjustment in fractions for all other Subcommunities. (Note that the sum of allocation fractions across all affected subcommunities equals one.) The "ENTER" key causes changes to be recorded and adjustments to be made. Control is returned to screen S5.

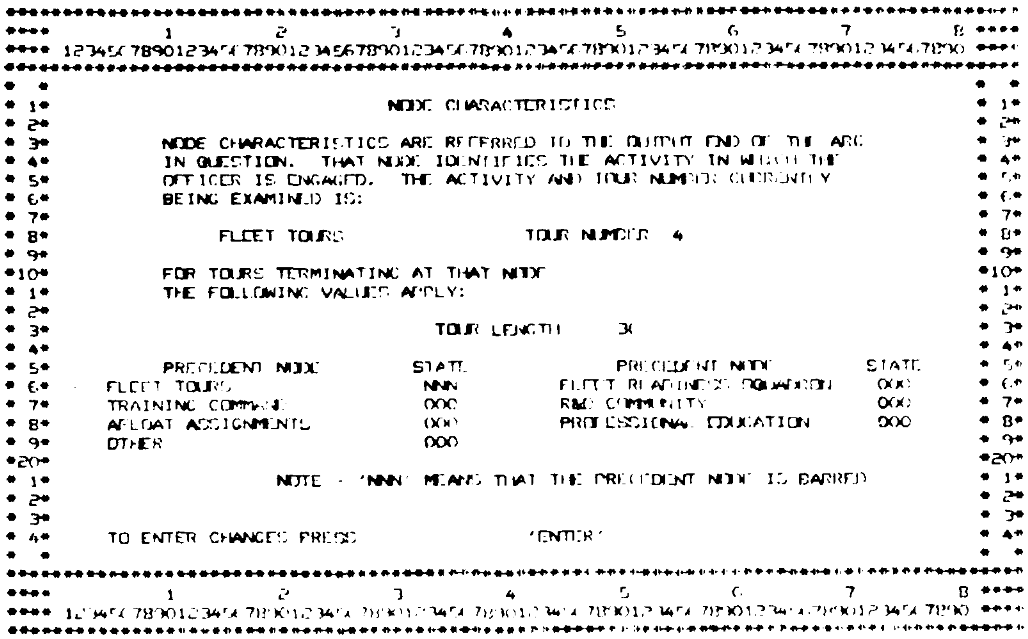


```
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*  *
* 1*
* 2*    YOU CAN INSPECT AND/OR MODIFY THE CAREER PATH NETWORK CHARACTERISTICS
* 3*    ASSOCIATED WITH ANY NODE IN THE NETWORK.  TO SELECT A PARTICULAR NODE
* 4*    REPLACE THE 'O' IN THE DIAGRAM BELOW WITH AN 'X'.  TO BYPASS A NODE
* 5*    PRESS 'TAB'.
* 6*
* 7*
* 8*                                          TOUR NUMBER
* 9*
*10*                   ACTIVITY            1    2    3    4    5    6    7
* 1*
* 2*         FLEET TOURS                   o    o    o    x    o    o    o
* 3*         FLEET READINESS SQUADRON      o    o    o    o    o    o    o
* 4*         TRAINING COMMAND              o    o    o    o    o    o    o
* 5*         R&D COMMUNITY                 o    o    o    o    o    o    o
* 6*         AFLOAT ASSIGNMENTS            o    o    o    o    o    o    o
* 7*         PROFESSIONAL EDUCATION        o    o    o    o    o    o    o
* 8*         OTHER                         o    o    o    o    o    o    o
* 9*
*20*
* 1*
* 2*
* 3*    TO BEGIN NODE INSPECTION/MODIFICATION PRESS          'ENTER'
* 4*    TO RETURN TO CATEGORY MENU PRESS                     'PF-1'
*  *
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
```

CAREER PATH NETWORK SCREEN #1 (PARAMETER REVIEW)

This screen displays nodes for the Career Path Network. The user can inspect and/or modify the characteristics associated with any node. To inspect/modify a node, replace any "o" with an "x" in the 'tour number' table and press "ENTER". Note that the user may select as many nodes for inspection/modification as desired. The TAB key will step the cursor from node to node in the display. The control of the program continues with screen S11 if a node/nodes are to be inspected/modified. Otherwise the control returns to Screen S5.

S11

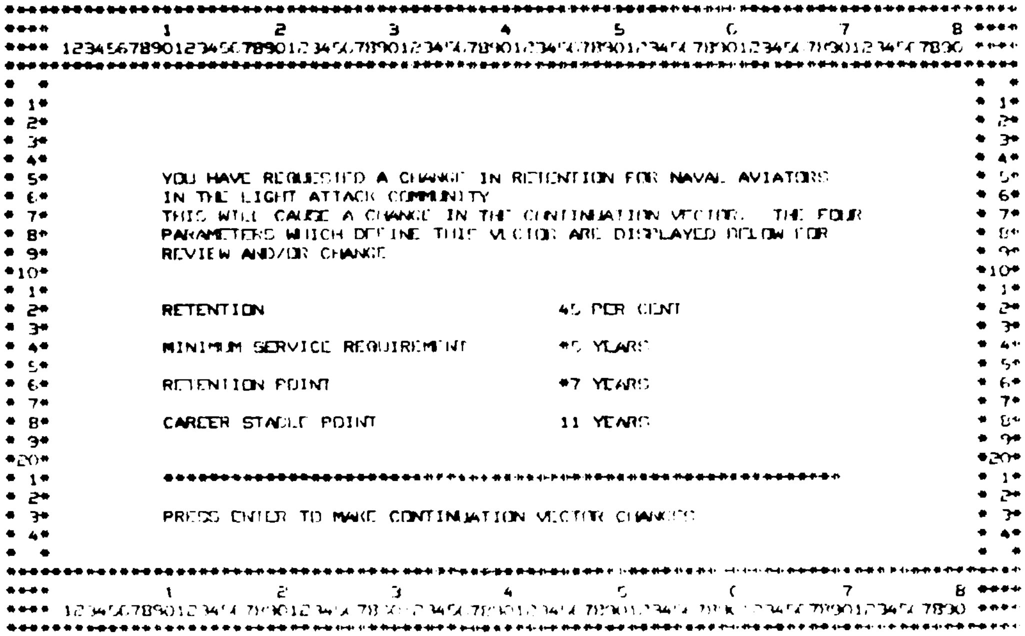


```
********************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
********************************************************************************************
*  *                                                                                  *  *
* 1*                              NODE CHARACTERISTICS                                * 1*
* 2*                                                                                  * 2*
* 3*        NODE CHARACTERISTICS ARE REFERRED TO THE OUTPUT END OF THE ARC            * 3*
* 4*        IN QUESTION.  THAT NODE IDENTIFIES THE ACTIVITY IN WHICH THE              * 4*
* 5*        OFFICER IS ENGAGED.  THE ACTIVITY AND TOUR NUMBER CURRENTLY               * 5*
* 6*        BEING EXAMINED IS:                                                        * 6*
* 7*                                                                                  * 7*
* 8*             FLEET TOURS                    TOUR NUMBER  4                        * 8*
* 9*                                                                                  * 9*
*10*        FOR TOURS TERMINATING AT THAT NODE                                        *10*
* 1*        THE FOLLOWING VALUES APPLY:                                               * 1*
* 2*                                                                                  * 2*
* 3*                                  TOUR LENGTH     30                              * 3*
* 4*                                                                                  * 4*
* 5*        PRECEDENT NODE          STATE              PRECEDENT NODE         STATE   * 5*
* 6*   FLEET TOURS                   NNN         FLEET READINESS SQUADRON     000     * 6*
* 7*   TRAINING COMMAND              000         R&D COMMUNITY                000     * 7*
* 8*   AFLOAT ASSIGNMENTS            000         PROFESSIONAL EDUCATION       000     * 8*
* 9*   OTHER                         000                                              * 9*
*20*                                                                                  *20*
* 1*                   NOTE - 'NNN' MEANS THAT THE PRECEDENT NODE IS BARRED           * 1*
* 2*                                                                                  * 2*
* 3*                                                                                  * 3*
* 4*   TO ENTER CHANGES PRESS                      'ENTER'                            * 4*
*  *                                                                                  *  *
********************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
********************************************************************************************
```

CAREER PATH NETWORK SCREEN #2 (PARAMETER REVIEW)

This screen reconfirms the activity and tour number that the user has chosen to inspect/modify. At this point, the user may change the value of the tour length for tours ending at that node. He may also make available any of the seven pecedent nodes. Once the user has made desired changes and is ready to record these changes, he must depress "ENTER". This screen will appear for each x that the user placed into the table on the previous screen (S10). Once all x's have been inspected/modified, the program will return the user to the Parameter Category Menu Screen (S5).

S12



```
YOU HAVE REQUESTED A CHANGE IN RETENTION FOR NAVAL AVIATORS
IN THE LIGHT ATTACK COMMUNITY
THIS WILL CAUSE A CHANGE IN THE CONTINUATION VECTOR.  THE FOUR
PARAMETERS WHICH DEFINE THIS VECTOR ARE DISPLAYED BELOW FOR
REVIEW AND/OR CHANGE


RETENTION                            45 PER CENT

MINIMUM SERVICE REQUIREMENT          *5 YEARS

RETENTION POINT                      *7 YEARS

CAREER STABLE POINT                  11 YEARS


************************************************************


PRESS ENTER TO MAKE CONTINUATION VECTOR CHANGES
```

RETENTION SCREEN

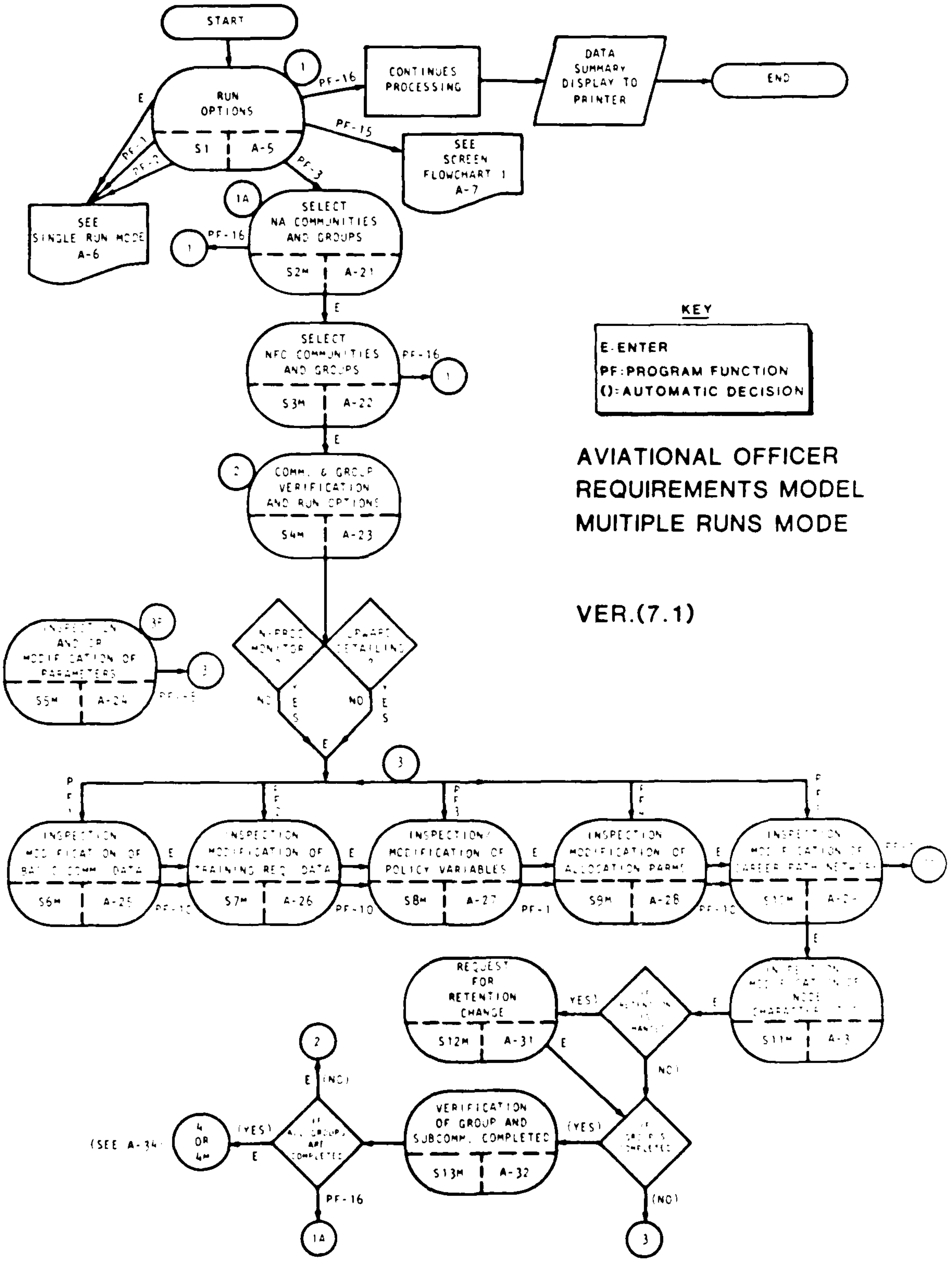
If the user had previously requested a change in retention (S9), the above screen will be displayed. A change in retention will cause the Continuation Vector to change. This screen shows the four parameters that determine the Continuation Vector and offers the user the opportunity to change those parameters or continue the process.

-NOTE-

This is the last screen before the program iterations start. To follow execution and processing sequence turn to page A-33.

MULTIPLE COMMUNITY RUN

The following pages A-20 to A-32 explain and describe the screens in MULTIPLE COMMUNITY processing. Figure A-2 on the following page is a basic flow diagram showing the logical sequence of screens displayed in MULTIPLE RUN mode. The remainder of this section is devoted to a detailed description of each screen in the flow diagram.


START
RUN OPTIONS
S1 | A-5
PF-16
CONTINUES PROCESSING
DATA SUMMARY DISPLAY TO PRINTER
END
PF-15
SEE SCREEN FLOWCHART 1 A-7
E
PF-1
PF-2
PF-3
SEE SINGLE RUN MODE A-6
1
1A
SELECT NA COMMUNITIES AND GROUPS
S2M | A-21
SELECT NFO COMMUNITIES AND GROUPS
S3M | A-22
2
COMM. & GROUP VERIFICATION AND RUN OPTIONS
S4M | A-23
3P
INSPECTION AND/OR MODIFICATION OF PARAMETERS
S5M | A-24
UPWARD DETAILING ?
NO
YES
3
INSPECTION MODIFICATION OF BASIC COMM. DATA
S6M | A-25
INSPECTION MODIFICATION OF TRAINING REQ. DATA
S7M | A-26
INSPECTION/ MODIFICATION OF POLICY VARIABLES
S8M | A-27
INSPECTION MODIFICATION OF ALLOCATION PARMS
S9M | A-28
INSPECTION MODIFICATION OF CAREER PATH NETWORK
PF-10
PF-1
REQUEST FOR RETENTION CHANGE
S12M | A-31
YES
NO
S11M
VERIFICATION OF GROUP AND SUBCOMM. COMPLETED
S13M | A-32
(YES)
(NO)
E (NO)
(SEE A-34)
4 OR 4M
PF-16
2

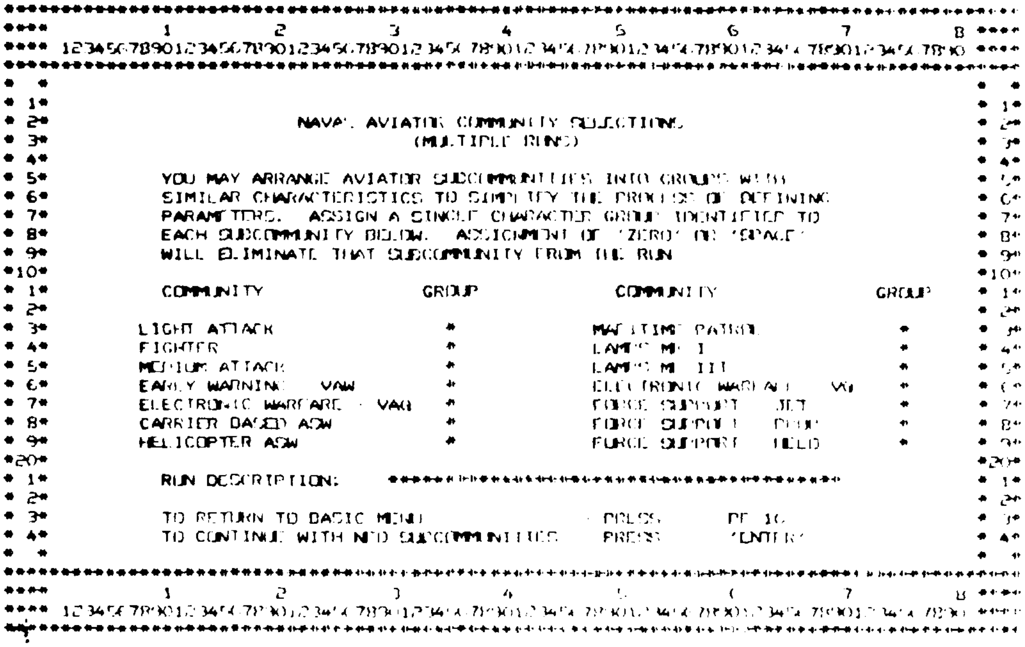
KEY

E:ENTER
PF:PROGRAM FUNCTION
():AUTOMATIC DECISION

AVIATIONAL OFFICER
REQUIREMENTS MODEL
MUITIPLE RUNS MODE

VER.(7.1)

FIGURE A-2

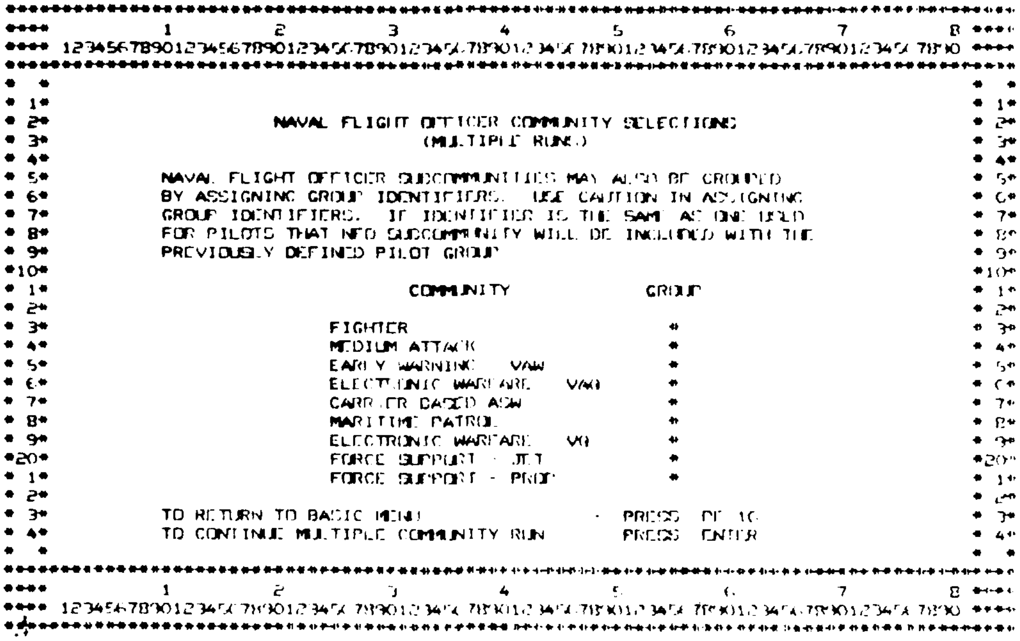


```
************************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
************************************************************************************************
*  *                                                                                *  *
* 1*                                                                                * 1*
* 2*                       NAVAL AVIATOR COMMUNITY SELECTION                        * 2*
* 3*                              (MULTIPLE RUNS)                                   * 3*
* 4*                                                                                * 4*
* 5*          YOU MAY ARRANGE AVIATOR SUBCOMMUNITIES INTO GROUPS WITH               * 5*
* 6*          SIMILAR CHARACTERISTICS TO SIMPLIFY THE PROCESS OF DEFINING           * 6*
* 7*          PARAMETERS.  ASSIGN A SINGLE CHARACTER GROUP IDENTIFIER TO            * 7*
* 8*          EACH SUBCOMMUNITY BELOW.  ASSIGNMENT OF 'ZERO' OR 'SPACE'             * 8*
* 9*          WILL ELIMINATE THAT SUBCOMMUNITY FROM THE RUN                         * 9*
*10*                                                                                *10*
* 1*          COMMUNITY               GROUP          COMMUNITY               GROUP  * 1*
* 2*                                                                                * 2*
* 3*        LIGHT ATTACK                *          MARITIME PATROL             *    * 3*
* 4*        FIGHTER                     *          LAMPS MK I                  *    * 4*
* 5*        MEDIUM ATTACK               *          LAMPS MK III                *    * 5*
* 6*        EARLY WARNING   VAW         *          ELECTRONIC WARFARE   VQ     *    * 6*
* 7*        ELECTRONIC WARFARE - VAQ    *          FORCE SUPPORT   JET         *    * 7*
* 8*        CARRIER BASED ASW           *          FORCE SUPPORT   PROP        *    * 8*
* 9*        HELICOPTER ASW              *          FORCE SUPPORT   HELO        *    * 9*
*20*                                                                                *20*
* 1*          RUN DESCRIPTION:     ****************************************         * 1*
* 2*                                                                                * 2*
* 3*          TO RETURN TO BASIC MENU                  PRESS      PF 10             * 3*
* 4*          TO CONTINUE WITH NFO SUBCOMMUNITIES      PRESS      'ENTER'           * 4*
*  *                                                                                *  *
************************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
************************************************************************************************
```

NAVAL AVIATOR COMMUNITY SELECTION (MULTIPLE RUNS)

By pressing the PF-3 key while the Community Selection Screen (S1) is displayed, the model adapts for multiple runs and shows the above screen. This screen allows the user to group Subcommunities with similar characteristics. This is done by assigning the same alpha-character (group identifier) to all Subcommunities that will be included in a given group. To eliminate a Subcommunity from the run, put a "0" (ZERO) in the corresponding group column. If Subcommunities are left blank (i.e., space), the model will assign that Subcommunity by default values. To continue with NFO SUBCOMMUNITIES, press "ENTER" (see next page).

S3M



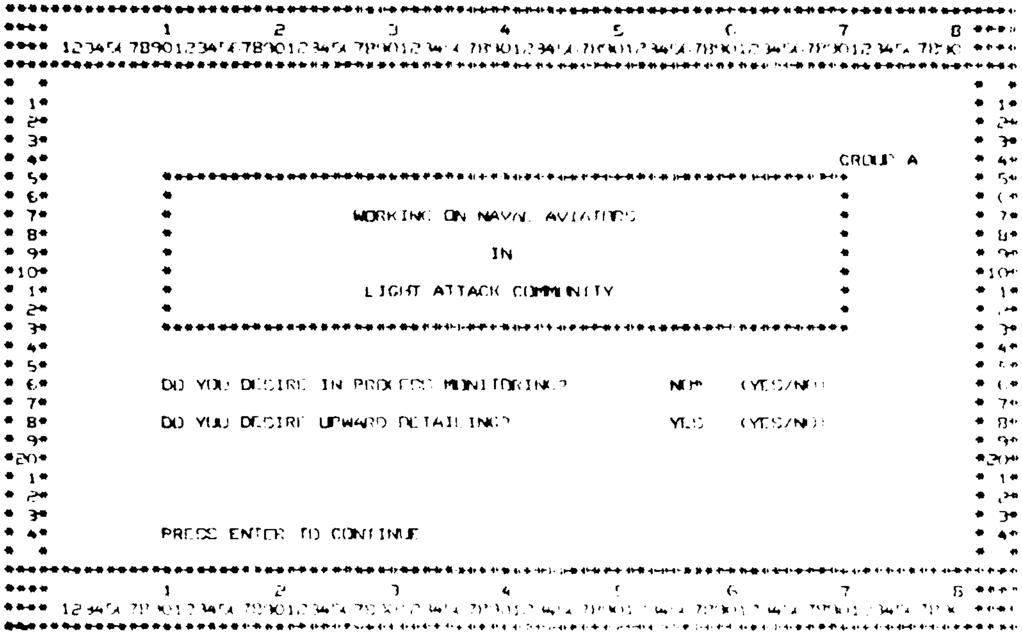
```
**********************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
**********************************************************************************************
*  *                                                                                  *  *
* 1*                                                                                  * 1*
* 2*                   NAVAL FLIGHT OFFICER COMMUNITY SELECTIONS                      * 2*
* 3*                               (MULTIPLE RUNS)                                    * 3*
* 4*                                                                                  * 4*
* 5*          NAVAL FLIGHT OFFICER SUBCOMMUNITIES MAY ALSO BE GROUPED                 * 5*
* 6*          BY ASSIGNING GROUP IDENTIFIERS.  USE CAUTION IN ASSIGNING               * 6*
* 7*          GROUP IDENTIFIERS.  IF IDENTIFIER IS THE SAME AS ONE USED               * 7*
* 8*          FOR PILOTS THAT NFO SUBCOMMUNITY WILL BE INCLUDED WITH THE              * 8*
* 9*          PREVIOUSLY DEFINED PILOT GROUP                                          * 9*
*10*                                                                                  *10*
* 1*                              COMMUNITY            GROUP                          * 1*
* 2*                                                                                  * 2*
* 3*                        FIGHTER                      *                            * 3*
* 4*                        MEDIUM ATTACK                *                            * 4*
* 5*                        EARLY WARNING    VAW         *                            * 5*
* 6*                        ELECTRONIC WARFARE   VAQ     *                            * 6*
* 7*                        CARRIER BASED ASW            *                            * 7*
* 8*                        MARITIME PATROL              *                            * 8*
* 9*                        ELECTRONIC WARFARE   VQ      *                            * 9*
*20*                        FORCE SUPPORT - JET          *                            *20*
* 1*                        FORCE SUPPORT - PROP         *                            * 1*
* 2*                                                                                  * 2*
* 3*          TO RETURN TO BASIC MENU               - PRESS  PF 16                    * 3*
* 4*          TO CONTINUE MULTIPLE COMMUNITY RUN      PRESS  ENTER                    * 4*
*  *                                                                                  *  *
**********************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
**********************************************************************************************
```

NFO'S COMMUNITY SELECTIONS (MULTIPLE RUNS)

When "ENTER" is pressed while the NAVAL AVIATOR COMMUNITY SELECTIONS (multiple runs) screen (S4) is displayed, the model continues with NFOs Community Selections (multiple runs). This allows the user to create Subcommunities as on the previous page (A-21). If the user wishes to return to the Community Selection Menu Screen (S1), press PF-16. Otherwise, press "ENTER" to continue.

(Note - if the user uses the same group identifier for both PILOTS AND NFO's they will be assigned to the same group.)

S4M



```
                                                         GROUP A

            WORKING ON NAVAL AVIATORS

                       IN

             LIGHT ATTACK COMMUNITY


DO YOU DESIRE IN PROCESS MONITORING?          NO    (YES/NO)

DO YOU DESIRE UPWARD DETAILING?               YES   (YES/NO)




PRESS ENTER TO CONTINUE
```

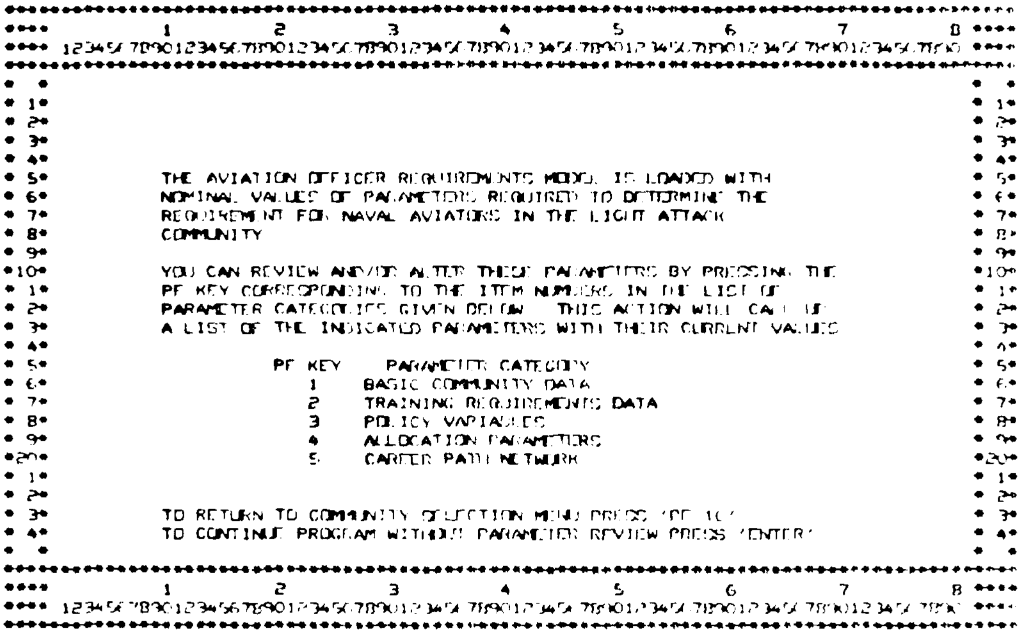
COMMUNITY VERIFICATION AND RUN OPTIONS (MULTIPLE RUN)

This screen is functionally identical to screen S4 in single run mode (see A-10).

NOTE

The following multiple run screens S4M-S12M are functionally identical to screens S4-S12 in SINGLE RUN mode. In MULTIPLE RUN mode, however, these screens will display a group identifier in the top right corner. The group identifier indicates that the model is in the MULTIPLE RUN mode and identifies the group currently being processed.

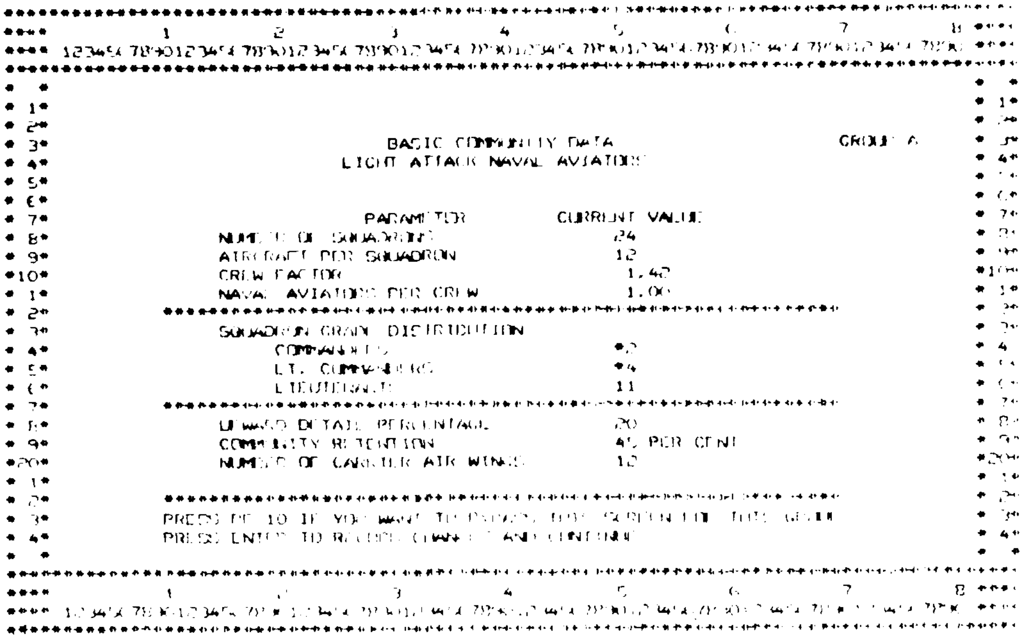
S5M



```
THE AVIATION OFFICER REQUIREMENTS MODEL IS LOADED WITH
NOMINAL VALUES OF PARAMETERS REQUIRED TO DETERMINE THE
REQUIREMENT FOR NAVAL AVIATORS IN THE LIGHT ATTACK
COMMUNITY

YOU CAN REVIEW AND/OR ALTER THESE PARAMETERS BY PRESSING THE
PF KEY CORRESPONDING TO THE ITEM NUMBERS IN THE LIST OF
PARAMETER CATEGORIES GIVEN BELOW   THIS ACTION WILL CALL UP
A LIST OF THE INDICATED PARAMETERS WITH THEIR CURRENT VALUES

               PF KEY    PARAMETER CATEGORY
                  1      BASIC COMMUNITY DATA
                  2      TRAINING REQUIREMENTS DATA
                  3      POLICY VARIABLES
                  4      ALLOCATION PARAMETERS
                  5      CAREER PATH NETWORK


TO RETURN TO COMMUNITY SELECTION MENU PRESS 'PF 10'
TO CONTINUE PROGRAM WITHOUT PARAMETER REVIEW PRESS 'ENTER'
```

PARAMETER CATEGORY MENU SCREEN (MULTIPLE RUN)

This screen appears only if the user selected the PF-1 utility when screen S10M was displayed. This screen permits the user to reinspect a parameter category for the current group identifier. Note that screens which have been bypassed can not be redisplayed.



```
                    BASIC COMMUNITY DATA                    GROUP A
                LIGHT ATTACK NAVAL AVIATORS

                       PARAMETER          CURRENT VALUE
          NUMBER OF SQUADRONS                 24
          AIRCRAFT PER SQUADRON               12
          CREW FACTOR                          1.42
          NAVAL AVIATORS PER CREW              1.00
      ***************************************************************
          SQUADRON GRADE DISTRIBUTION
               COMMANDERS                     *2
               LT. COMMANDERS                 *4
               LIEUTENANTS                    11
      ***************************************************************
          UPWARD DETAIL PERCENTAGE            20
          COMMUNITY RETENTION                 45 PER CENT
          NUMBER OF CARRIER AIR WINGS         12

      ***************************************************************
      PRESS PF 10 IF YOU WANT TO BYPASS THIS SCREEN FOR THIS GROUP
      PRESS ENTER TO RECORD CHANGES AND CONTINUE
```

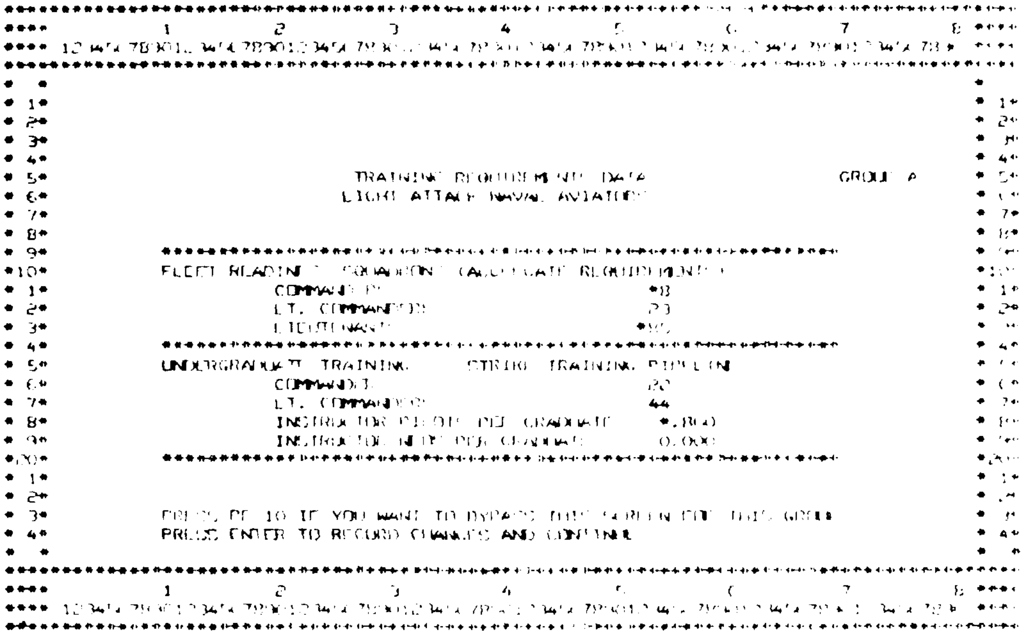
BASIC COMMUNITY DATA SCREEN (MULTIPLE RUN)

This screen is functionally identical to screen S6 in SINGLE RUN mode (see A-12).

NOTE

Screens S6M-S11M will appear automatically in the sequence shown. Some of the screens have a PF-10 utility which allows the user to bypass all subsequent screens in that parameter category for the entire group. Screens without this utility will be bypassed automatically. Screen S8M and S10M have a PF-1 utility which allows the redisplay of prior screens.

S7M

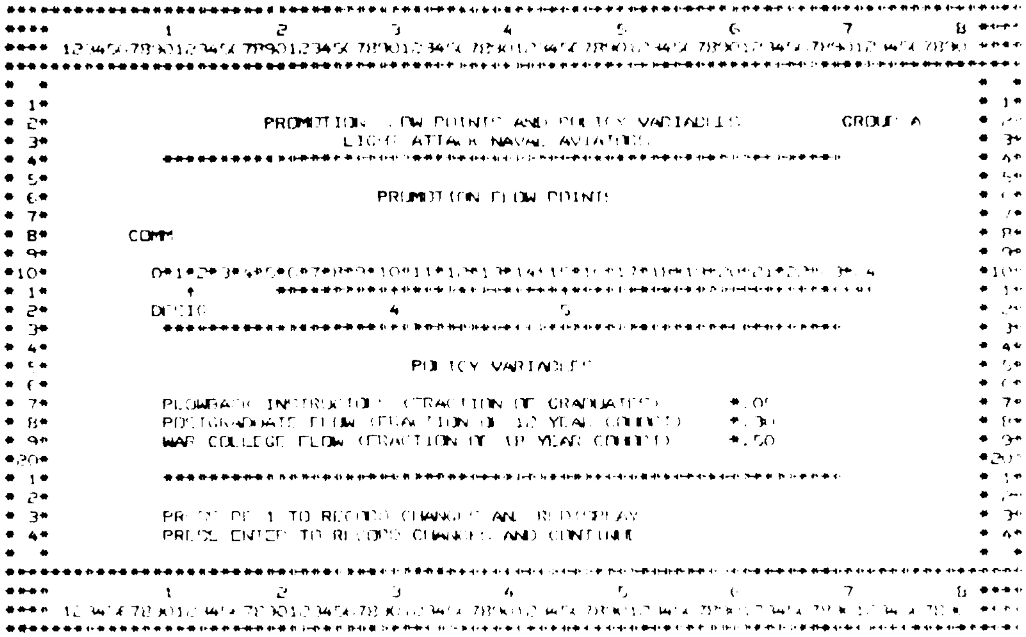


```
             1         2         3         4         5         6         7         8
    1234567890123456789012345678901234567890123456789012345678901234567890123456789

                       TRAINING REQUIREMENTS DATA                   GROUP A
                       LIGHT ATTACK NAVAL AVIATORS

         FLEET READINESS SQUADRONS (AGGREGATE REQUIREMENTS)
                   COMMANDERS                          [illegible]8
                   LT. COMMANDERS                      23
                   LIEUTENANTS                         [illegible]

         UNDERGRADUATE TRAINING      STRIKE TRAINING PIPELINE
                   COMMANDER                           20
                   LT. COMMANDER                       44
                   INSTRUCTOR PILOTS PER GRADUATE      [illegible]
                   INSTRUCTOR NFOS PER GRADUATE        0.000

         PRESS PF 10 IF YOU WANT TO BYPASS THIS SCREEN FOR THIS GROUP
         PRESS ENTER TO RECORD CHANGES AND CONTINUE

             1         2         3         4         5         6         7         8
    1234567890123456789012345678901234567890123456789012345678901234567890123456789
```

TRAINING REQUIREMENTS DATA SCREEN (MULTIPLE RUN)

This screen is functionally identical to screen S7 in SINGLE RUN mode (See A-13).

S8M



```
****        1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
*  *                                                                                 *  *
* 1*                                                                                 * 1*
* 2*                PROMOTION FLOW POINTS AND POLICY VARIABLES          GROUP A      * 2*
* 3*                       LIGHT ATTACK NAVAL AVIATORS                               * 3*
* 4*           *********************************************************             * 4*
* 5*                                                                                 * 5*
* 6*                          PROMOTION FLOW POINTS                                  * 6*
* 7*                                                                                 * 7*
* 8*      COMM                                                                       * 8*
* 9*                                                                                 * 9*
*10*         0*1*2*3*4*5*6*7*8*9*10*11*12*13*14*15*16*17*18*19*20*21*22*23*24        *10*
* 1*           *         ******************************************************      * 1*
* 2*         DESIG                4              5                                   * 2*
* 3*           *********************************************************             * 3*
* 4*                                                                                 * 4*
* 5*                             POLICY VARIABLES                                    * 5*
* 6*                                                                                 * 6*
* 7*           PLOWBACK INSTRUCTORS (FRACTION OF GRADUATES)          *.05            * 7*
* 8*           POSTGRADUATE FLOW (FRACTION OF 12 YEAR COHORT)        *.30            * 8*
* 9*           WAR COLLEGE FLOW (FRACTION OF 18 YEAR COHORT)         *.50            * 9*
*20*                                                                                 *20*
* 1*           *********************************************************             * 1*
* 2*                                                                                 * 2*
* 3*           PRESS PF 1 TO RECORD CHANGES AND REDISPLAY                            * 3*
* 4*           PRESS ENTER TO RECORD CHANGES AND CONTINUE                            * 4*
*  *                                                                                 *  *
*****************************************************************************************
****        1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
*****************************************************************************************
```

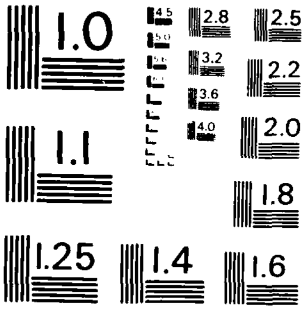
PROMOTION FLOW POINTS AND POLICY VARIABLES SCREEN (MULTIPLE RUN

This screen is functionally identical to screen S8 in SINGLE RUN mode (See A-14).

AD-A134 293 AVIATION OFFICER REQUIREMENTS STUDY(U) INFORMATION
SPECTRUM INC ARLINGTON VA F E O'CONNOR 31 AUG 82
ISI-V-83-2693-02 N00014-81-C-0368

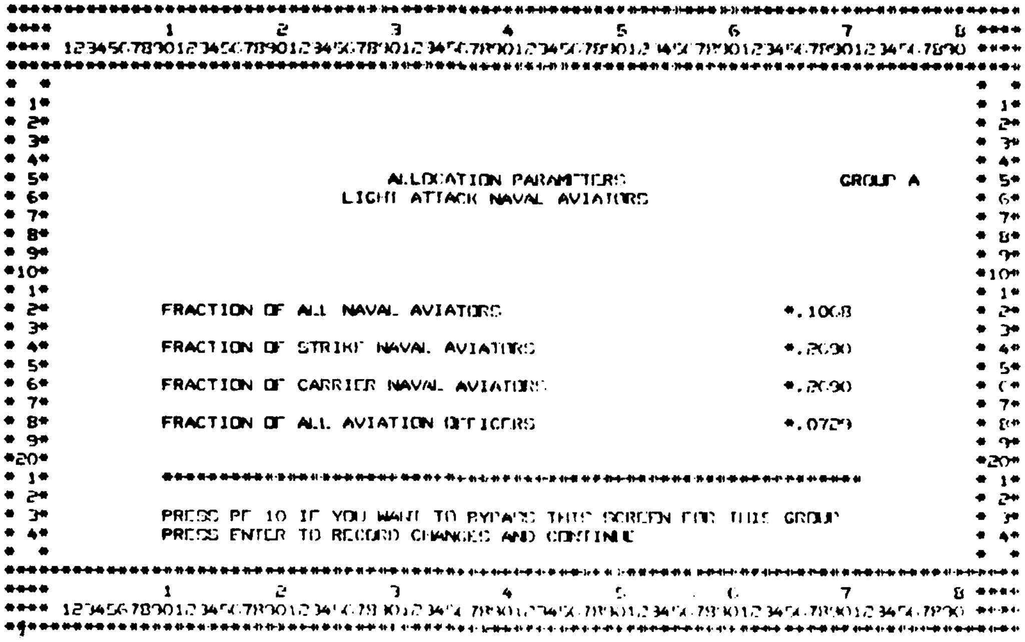
2/3

UNCLASSIFIED F/G 5/9 NL


1.0
4.5
5.0
2.8
2.5
3.2
2.2
3.6
4.0
2.0
1.1
1.8
1.25
1.4
1.6

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

S9M

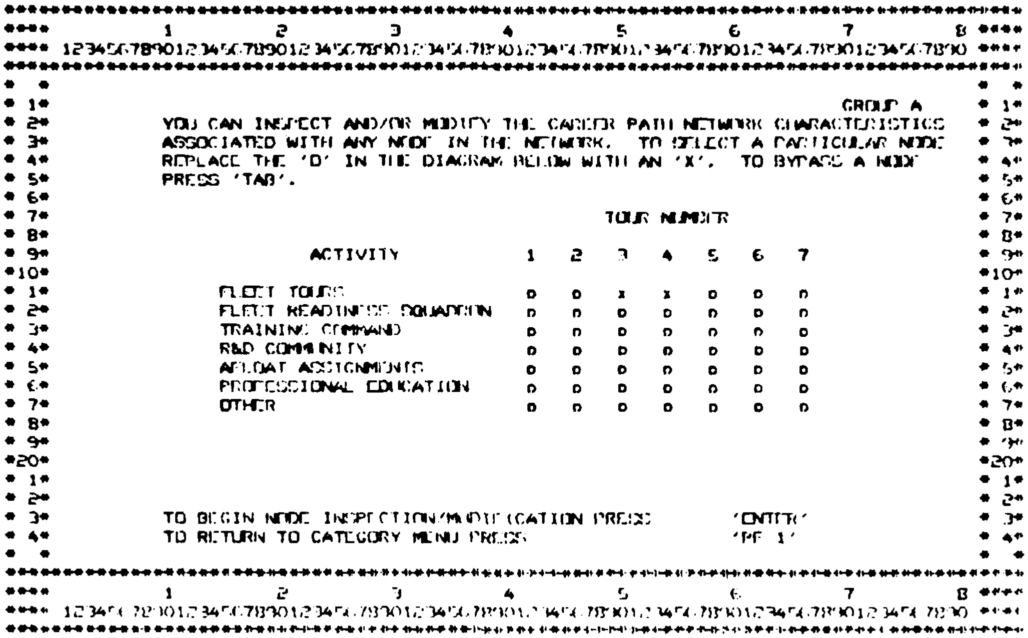


```
******************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
******************************************************************************************
*  *                                                                                *  *
* 1*                                                                                * 1*
* 2*                                                                                * 2*
* 3*                                                                                * 3*
* 4*                                                                                * 4*
* 5*                           ALLOCATION PARAMETERS                  GROUP A       * 5*
* 6*                       LIGHT ATTACK NAVAL AVIATORS                              * 6*
* 7*                                                                                * 7*
* 8*                                                                                * 8*
* 9*                                                                                * 9*
*10*                                                                                *10*
* 1*                                                                                * 1*
* 2*          FRACTION OF ALL NAVAL AVIATORS                       *.1068           * 2*
* 3*                                                                                * 3*
* 4*          FRACTION OF STRIKE NAVAL AVIATORS                    *.2090           * 4*
* 5*                                                                                * 5*
* 6*          FRACTION OF CARRIER NAVAL AVIATORS                   *.2090           * 6*
* 7*                                                                                * 7*
* 8*          FRACTION OF ALL AVIATION OFFICERS                    *.0729           * 8*
* 9*                                                                                * 9*
*20*                                                                                *20*
* 1*          ***********************************************************           * 1*
* 2*                                                                                * 2*
* 3*          PRESS PF 10 IF YOU WANT TO BYPASS THIS SCREEN FOR THIS GROUP          * 3*
* 4*          PRESS ENTER TO RECORD CHANGES AND CONTINUE                            * 4*
*  *                                                                                *  *
******************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
******************************************************************************************
```

ALLOCATION PARAMETERS SCREEN (MULTIPLE RUN)

This screen is functionally identical to screen S9 in SINGLE RUN mode (See A-15).

S10M

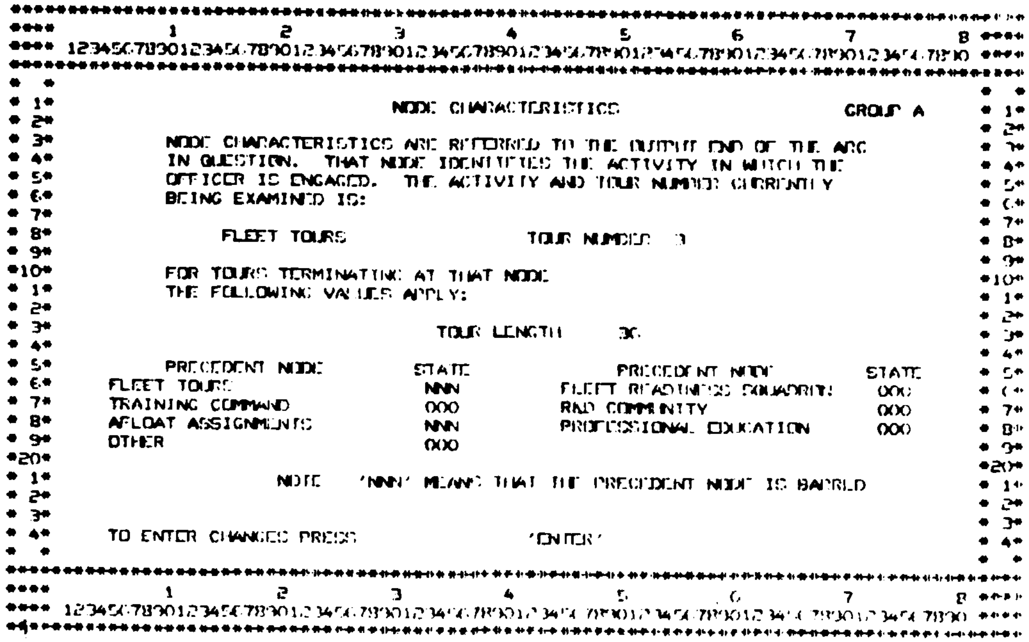


```
******************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
******************************************************************************************
*  *                                                                                  *  *
* 1*                                                                      GROUP A     * 1*
* 2*          YOU CAN INSPECT AND/OR MODIFY THE CAREER PATH NETWORK CHARACTERISTICS   * 2*
* 3*          ASSOCIATED WITH ANY NODE IN THE NETWORK.  TO SELECT A PARTICULAR NODE   * 3*
* 4*          REPLACE THE 'D' IN THE DIAGRAM BELOW WITH AN 'X'.  TO BYPASS A NODE     * 4*
* 5*          PRESS 'TAB'.                                                            * 5*
* 6*                                                                                  * 6*
* 7*                                                 TOUR NUMBER                      * 7*
* 8*                                                                                  * 8*
* 9*                       ACTIVITY           1   2   3   4   5   6   7               * 9*
*10*                                                                                  *10*
* 1*               FLEET TOURS                D   D   x   x   D   D   D               * 1*
* 2*               FLEET READINESS SQUADRON   D   D   D   D   D   D   D               * 2*
* 3*               TRAINING COMMAND           D   D   D   D   D   D   D               * 3*
* 4*               R&D COMMUNITY              D   D   D   D   D   D   D               * 4*
* 5*               AFLOAT ASSIGNMENTS         D   D   D   D   D   D   D               * 5*
* 6*               PROFESSIONAL EDUCATION     D   D   D   D   D   D   D               * 6*
* 7*               OTHER                      D   D   D   D   D   D   D               * 7*
* 8*                                                                                  * 8*
* 9*                                                                                  * 9*
*20*                                                                                  *20*
* 1*                                                                                  * 1*
* 2*                                                                                  * 2*
* 3*          TO BEGIN NODE INSPECTION/MODIFICATION PRESS       'ENTER'               * 3*
* 4*          TO RETURN TO CATEGORY MENU PRESS                  'PF 1'                * 4*
*  *                                                                                  *  *
******************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
******************************************************************************************
```

CAREER PATH NETWORK SCREEN #1 (MULTIPLE RUN)

This screen is functionally identical to screen S10 in SINGLE RUN mode (See A-16).

S11M

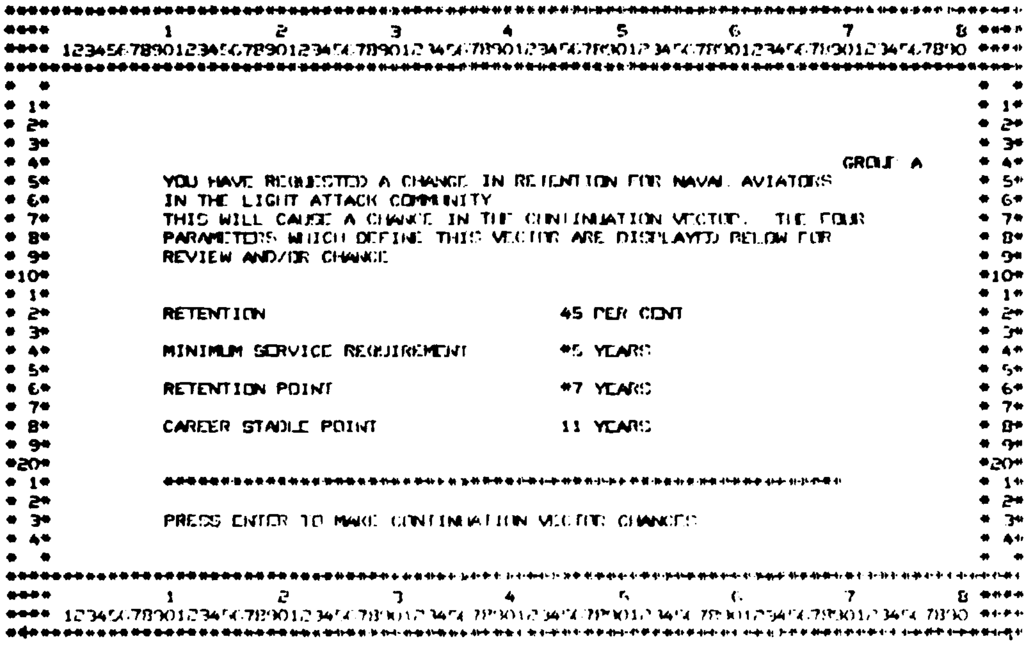


```
                                  NODE CHARACTERISTICS                        GROUP A

               NODE CHARACTERISTICS ARE REFERRED TO THE OUTPUT END OF THE ARC
               IN QUESTION.  THAT NODE IDENTIFIES THE ACTIVITY IN WHICH THE
               OFFICER IS ENGAGED.  THE ACTIVITY AND TOUR NUMBER CURRENTLY
               BEING EXAMINED IS:

                    FLEET TOURS                     TOUR NUMBER  3

               FOR TOURS TERMINATING AT THAT NODE
               THE FOLLOWING VALUES APPLY:

                                         TOUR LENGTH      36

               PRECEDENT NODE           STATE            PRECEDENT NODE         STATE
          FLEET TOURS                    NNN         FLEET READINESS SQUADRON    000
          TRAINING COMMAND               000         RAD COMMUNITY               000
          AFLOAT ASSIGNMENTS             NNN         PROFESSIONAL EDUCATION      000
          OTHER                          000

                          NOTE   'NNN' MEANS THAT THE PRECEDENT NODE IS BARRED


          TO ENTER CHANGES PRESS                    'ENTER'
```

CAREER PATH NETWORK SCREEN #2 (MULTIPLE RUN)

This screen is functionally identical to screen S11 in SINGLE RUN mode (See A-17).

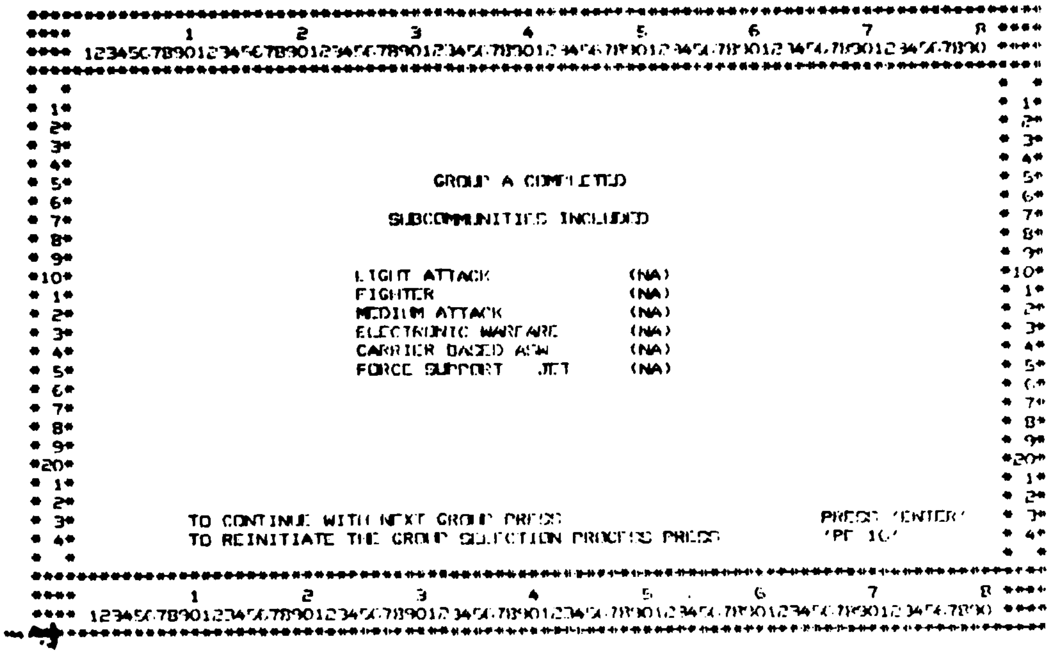
S12M



```
                                                              GROUP A
          YOU HAVE REQUESTED A CHANGE IN RETENTION FOR NAVAL AVIATORS
          IN THE LIGHT ATTACK COMMUNITY
          THIS WILL CAUSE A CHANGE IN THE CONTINUATION VECTOR.  THE FOUR
          PARAMETERS WHICH DEFINE THIS VECTOR ARE DISPLAYED BELOW FOR
          REVIEW AND/OR CHANGE


          RETENTION                             45 PER CENT

          MINIMUM SERVICE REQUIREMENT           *5 YEARS

          RETENTION POINT                       *7 YEARS

          CAREER STABLE POINT                   11 YEARS


          ************************************************************

          PRESS ENTER TO MAKE CONTINUATION VECTOR CHANGES
```

RETENTION SCREEN (MULTIPLE RUN)

This screen is functionally identical to screen S12 in SINGLE RUN mode (See A-18).



```
                    GROUP A COMPLETED

                 SUBCOMMUNITIES INCLUDED

              LIGHT ATTACK             (NA)
              FIGHTER                  (NA)
              MEDIUM ATTACK            (NA)
              ELECTRONIC WARFARE       (NA)
              CARRIER BASED ASW        (NA)
              FORCE SUPPORT    JET     (NA)

TO CONTINUE WITH NEXT GROUP PRESS                      PRESS 'ENTER'
TO REINITIATE THE GROUP SELECTION PROCESS PRESS        'PF 16'
```

GROUP AND SUBCOMMUNITIES COMPLETED SCREEN (MULTIPLE RUN)

This screen is an advisory screen which is displayed automatically when a group is completed. It shows the group identifier and all the Subcommunities included under that group. The user can continue the parameter inspection/modification process by pressing "ENTER", or by pressing PF-16 he may reinitiate the group selection process.

- NOTE -

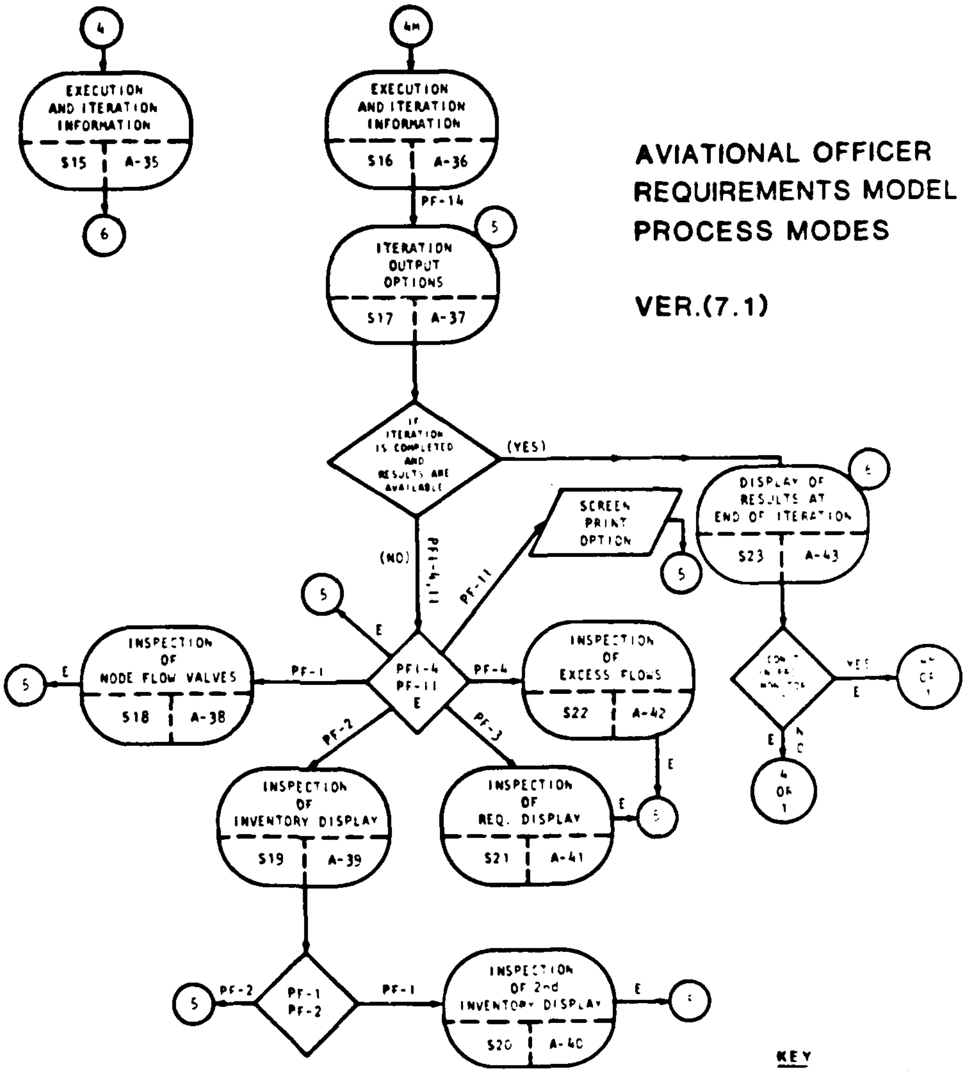
Execution will begin once all groups have completed the parameter inspection/modification process.

EXECUTION AND PROCESSING SEQUENCE

The following pages A-34 to A-43 explain and describe the screens during processing modes. The figure A-3 on the following page, is a basic flow diagram showing the logical sequence of screens displayed during processing. The remainder of this section is devoted to a detailed description of each screen in the flow diagram.

AVIATIONAL OFFICER REQUIREMENTS MODEL PROCESS MODES

VER.(7.1)


4
EXECUTION AND ITERATION INFORMATION
S15
A-35
6
4M
EXECUTION AND ITERATION INFORMATION
S16
A-36
PF-14
5
ITERATION OUTPUT OPTIONS
S17
A-37
IF ITERATION IS COMPLETED AND RESULTS ARE AVAILABLE
(YES)
6
DISPLAY OF RESULTS AT END OF ITERATION
S23
A-43
SCREEN PRINT OPTION
5
(NO)
PF1-4,11
PF-11
5
E
PF1-4
PF-11
E
PF-1
INSPECTION OF NODE FLOW VALVES
S18
A-38
E
5
PF-4
INSPECTION OF EXCESS FLOWS
S22
A-42
E
PF-2
PF-3
INSPECTION OF INVENTORY DISPLAY
S19
A-39
INSPECTION OF REQ. DISPLAY
S21
A-41
E
5
YES
E
OR
1
E
NO
4
OR
1
5
PF-2
PF-1
PF-2
PF-1
INSPECTION OF 2nd INVENTORY DISPLAY
S20
A-40
E

KEY

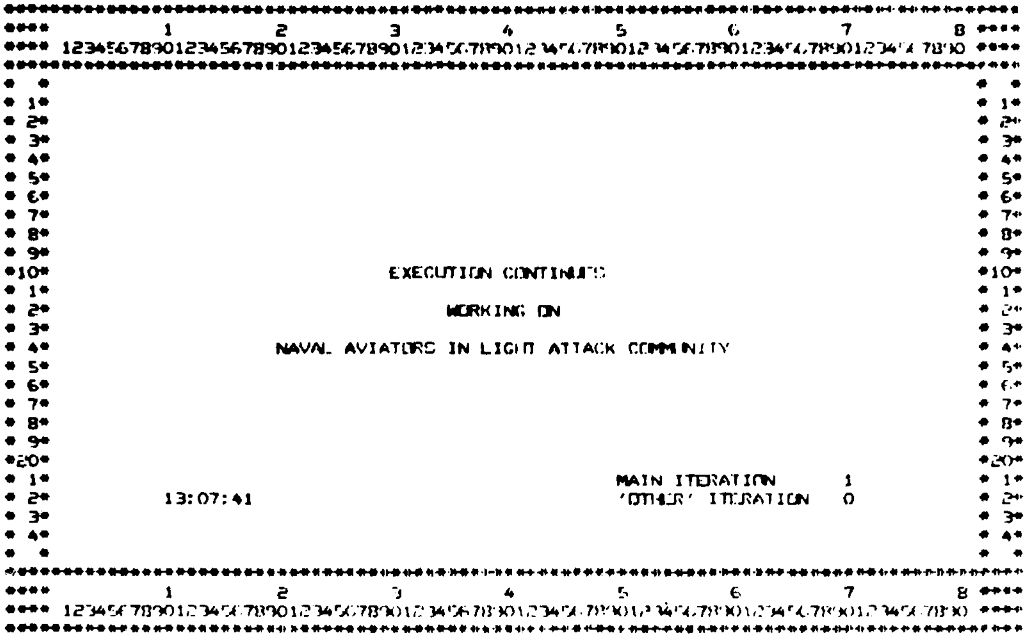
E ENTER

PF PROGRAM FUNCTION

() AUTOMATIC DECISION

FIGURE A-3

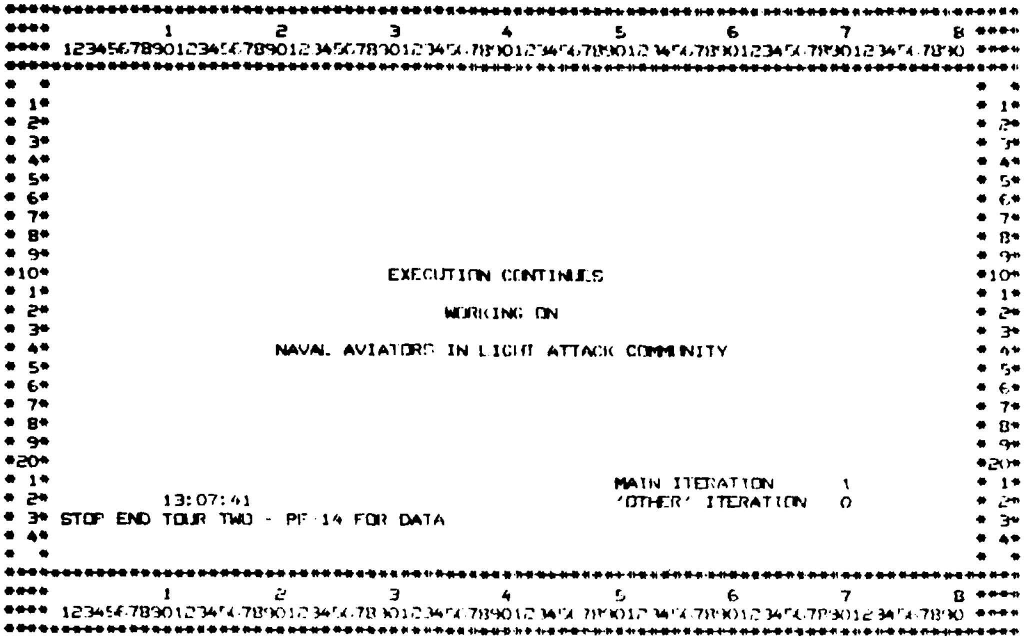
S15



```
                         EXECUTION CONTINUES

                              WORKING ON

                NAVAL AVIATORS IN LIGHT ATTACK COMMUNITY





                                                 MAIN ITERATION      1
       13:07:41                                  'OTHER' ITERATION   0
```

EXECUTION SCREEN (NO IN-PROCESS MONITORING)

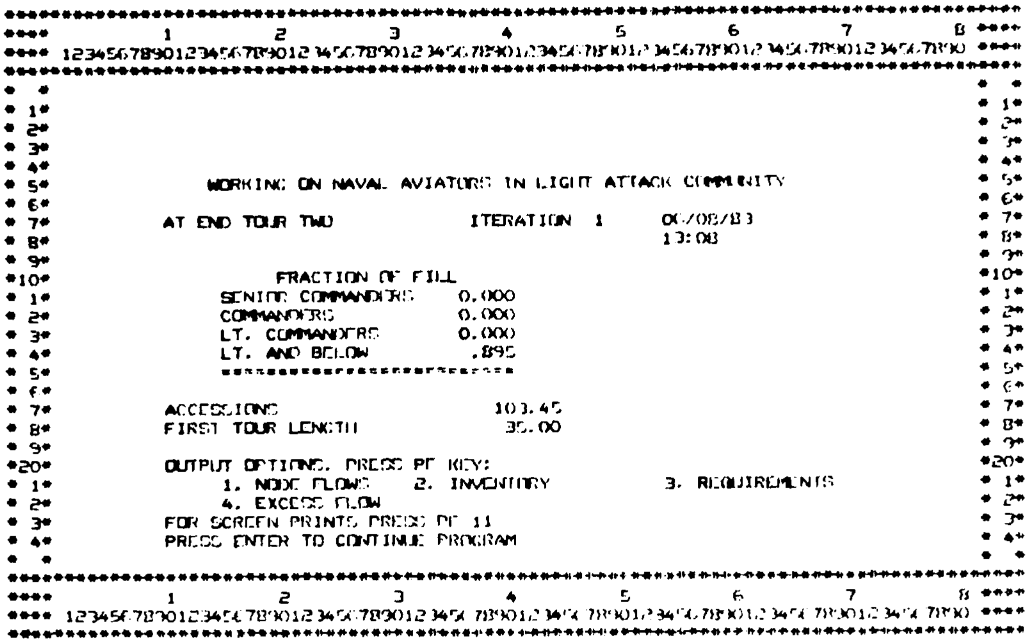
This is an advisory screen which appears during program execution (without IN-PROCESS MONITORING) displaying the current Community, Subcommunity, time, and current iteration information.



```
******************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
******************************************************************************************
*  *                                                                                  *  *
* 1*                                                                                  * 1*
* 2*                                                                                  * 2*
* 3*                                                                                  * 3*
* 4*                                                                                  * 4*
* 5*                                                                                  * 5*
* 6*                                                                                  * 6*
* 7*                                                                                  * 7*
* 8*                                                                                  * 8*
* 9*                                                                                  * 9*
*10*                             EXECUTION CONTINUES                                  *10*
* 1*                                                                                  * 1*
* 2*                                 WORKING ON                                       * 2*
* 3*                                                                                  * 3*
* 4*                   NAVAL AVIATORS IN LIGHT ATTACK COMMUNITY                       * 4*
* 5*                                                                                  * 5*
* 6*                                                                                  * 6*
* 7*                                                                                  * 7*
* 8*                                                                                  * 8*
* 9*                                                                                  * 9*
*20*                                                                                  *20*
* 1*                                                MAIN ITERATION     1              * 1*
* 2*          13:07:41                              'OTHER' ITERATION  0              * 2*
* 3* STOP END TOUR TWO - PF-14 FOR DATA                                               * 3*
* 4*                                                                                  * 4*
*  *                                                                                  *  *
******************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
******************************************************************************************
```

EXECUTION SCREEN (IN-PROCESS MONITORING)

This screen is an advisory screen which appears during program execution. IN-PROCESS MONITORING mode allows the user to stop and check the data at one or all stop-check points. To inspect data at check points, press PF-14 (see next page).



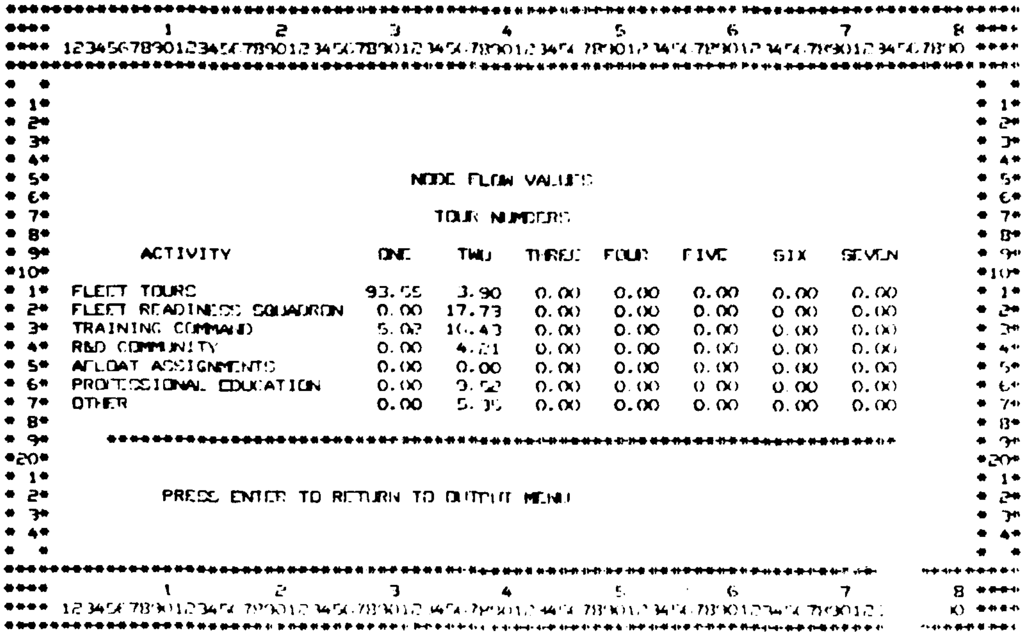
```
****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
****************************************************************************************
*  *                                                                                  *  *
* 1*                                                                                  * 1*
* 2*                                                                                  * 2*
* 3*                                                                                  * 3*
* 4*                                                                                  * 4*
* 5*               WORKING ON NAVAL AVIATORS IN LIGHT ATTACK COMMUNITY                * 5*
* 6*                                                                                  * 6*
* 7*           AT END TOUR TWO               ITERATION  1       06/08/83              * 7*
* 8*                                                            13:08                 * 8*
* 9*                                                                                  * 9*
*10*                   FRACTION OF FILL                                               *10*
* 1*               SENIOR COMMANDERS     0.000                                        * 1*
* 2*               COMMANDERS            0.000                                        * 2*
* 3*               LT. COMMANDERS        0.000                                        * 3*
* 4*               LT. AND BELOW          .895                                        * 4*
* 5*               ***********************                                            * 5*
* 6*                                                                                  * 6*
* 7*           ACCESSIONS                     103.45                                  * 7*
* 8*           FIRST TOUR LENGTH               35.00                                  * 8*
* 9*                                                                                  * 9*
*20*           OUTPUT OPTIONS. PRESS PF KEY:                                          *20*
* 1*               1. NODE FLOWS    2. INVENTORY              3. REQUIREMENTS         * 1*
* 2*               4. EXCESS FLOW                                                     * 2*
* 3*           FOR SCREEN PRINTS PRESS PF 11                                          * 3*
* 4*           PRESS ENTER TO CONTINUE PROGRAM                                        * 4*
*  *                                                                                  *  *
****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
****************************************************************************************
```

OUTPUT MENUS SCREEN (IN-PROCESS MONITORING)

This screen is displayed at each stop-check point if the user pressed PF-14 when screen S16 was displayed. It is also displayed when returning from an output option (screens S18-S22). This screen shows the extent to which the requirements have been filled thus far. The user may chose to look at any of four output options by pressing a PF-key. The next five pages of this appendix describe the output options. To print this screen or any of the IN-PROCESS MONITORING screens, press PF-11 while a particular screen is displayed.

- NOTE -

The only time this screen appears automatically (without user request) is at the end of each main iteration. The user would either press the "ENTER" key to continue processing or select an output option.

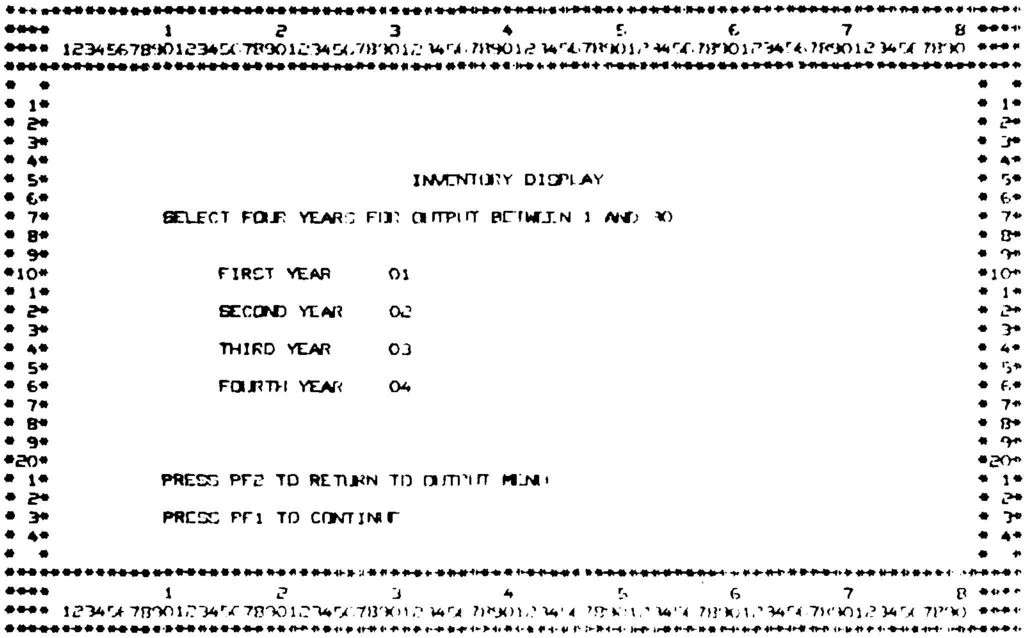


```
                              NODE FLOW VALUES

                                TOUR NUMBERS

         ACTIVITY                ONE     TWO   THREE  FOUR   FIVE    SIX   SEVEN

  FLEET TOURS                  93.55    3.90   0.00   0.00   0.00   0.00   0.00
  FLEET READINESS SQUADRON      0.00   17.73   0.00   0.00   0.00   0.00   0.00
  TRAINING COMMAND              5.02   10.43   0.00   0.00   0.00   0.00   0.00
  R&D COMMUNITY                 0.00    4.21   0.00   0.00   0.00   0.00   0.00
  AFLOAT ASSIGNMENTS            0.00    0.00   0.00   0.00   0.00   0.00   0.00
  PROFESSIONAL EDUCATION        0.00    3.52   0.00   0.00   0.00   0.00   0.00
  OTHER                         0.00    5.35   0.00   0.00   0.00   0.00   0.00

       ***********************************************************************


           PRESS ENTER TO RETURN TO OUTPUT MENU
```

NODE FLOW OUTPUT SCREENS (IN-PROCESS MONITORING)

This screen appears when the PF-1 key is selected from the Output Options screen S17. It displays the node flow values (which are the annual flows of officers) out of various nodes of the career path network. To print this screen, press PF-11. To return to the Output Menu Screen (S17), press "ENTER".

S19

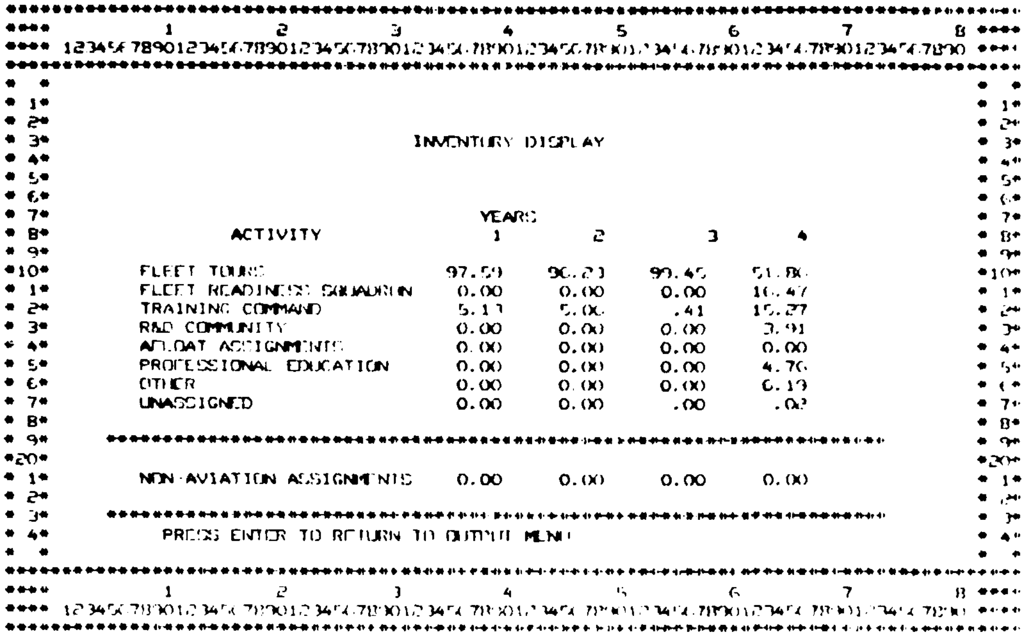


```
                         INVENTORY DISPLAY

     SELECT FOUR YEARS FOR OUTPUT BETWEEN 1 AND 30


          FIRST YEAR      01

          SECOND YEAR     02

          THIRD YEAR      03

          FOURTH YEAR     04




     PRESS PF2 TO RETURN TO OUTPUT MENU

     PRESS PF1 TO CONTINUE
```

INVENTORY DISPLAY OUTPUT SCREEN #1 (IN-PROCESS MONITORING)

This display appears when the PF-2 key is pressed when the Output Menu screen appears. Inventory consists of two screens. The first inventory screen allows the user to select up to 4 years for which he would like to see the inventory. This is done by typing in the years (between 1 and 30) for output. To see the requested years output, press PF-1. Press PF-2 to return to the Output Menu screen. Press PF-11 to print this screen.

S20

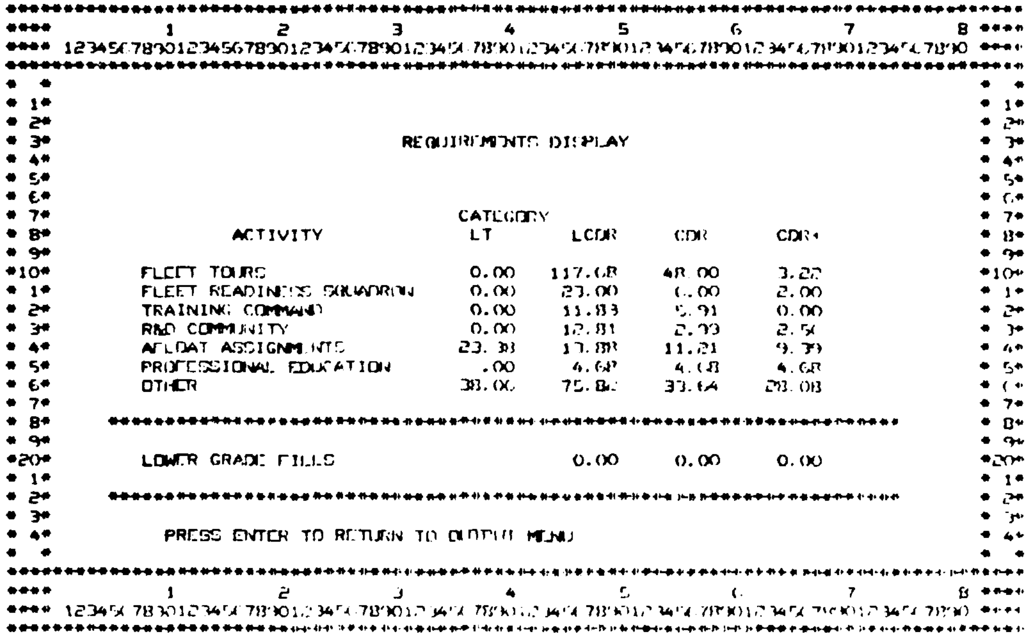


```
**********************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
**********************************************************************************************
*  *                                                                                *  *
* 1*                                                                                * 1*
* 2*                                                                                * 2*
* 3*                               INVENTORY DISPLAY                                * 3*
* 4*                                                                                * 4*
* 5*                                                                                * 5*
* 6*                                                                                * 6*
* 7*                                   YEARS                                        * 7*
* 8*           ACTIVITY                  1          2          3          4         * 8*
* 9*                                                                                * 9*
*10*      FLEET TOURS                  97.59      96.23      99.45      51.86       *10*
* 1*      FLEET READINESS SQUADRON      0.00       0.00       0.00      16.47       * 1*
* 2*      TRAINING COMMAND              5.13       5.06        .41      15.27       * 2*
* 3*      R&D COMMUNITY                 0.00       0.00       0.00       3.91       * 3*
* 4*      AFLOAT ASSIGNMENTS            0.00       0.00       0.00       0.00       * 4*
* 5*      PROFESSIONAL EDUCATION        0.00       0.00       0.00       4.76       * 5*
* 6*      OTHER                         0.00       0.00       0.00       6.13       * 6*
* 7*      UNASSIGNED                    0.00       0.00        .00        .02       * 7*
* 8*                                                                                * 8*
* 9*    ******************************************************************          * 9*
*20*                                                                                *20*
* 1*      NON-AVIATION ASSIGNMENTS      0.00       0.00       0.00       0.00       * 1*
* 2*                                                                                * 2*
* 3*    ******************************************************************          * 3*
* 4*        PRESS ENTER TO RETURN TO OUTPUT MENU                                    * 4*
*  *                                                                                *  *
**********************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
**********************************************************************************************
```

INVENTORY DISPLAY OUTPUT SCREEN #2 (IN-PROCESS MONITORING)

If the PF-1 key is pressed when screen S19 is displayed, the second inventory output screen (above) will appear. This screen displays the breakdown for each activity the years the user has requested. To print this screen, press PF-11. In order to return to the Output Menu screen (S17), press "ENTER".

S21

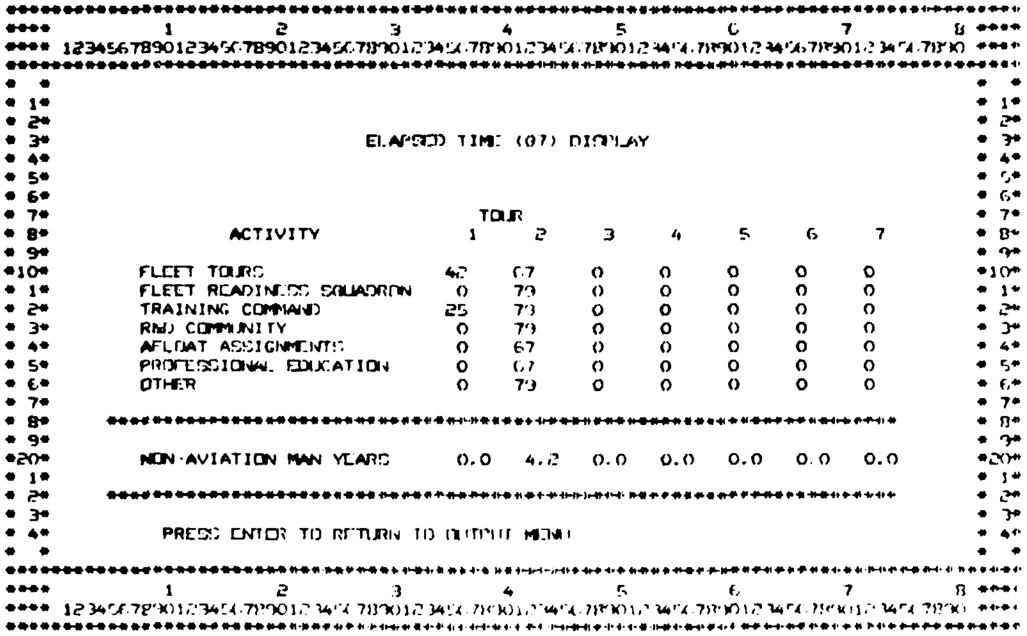


```
                         REQUIREMENTS DISPLAY



                                   CATEGORY
              ACTIVITY             LT        LCDR      CDR       CDR+

      FLEET TOURS                  0.00    117.08     48.00      3.22
      FLEET READINESS SQUADRON     0.00     23.00      6.00      2.00
      TRAINING COMMAND             0.00     11.83      5.91      0.00
      R&D COMMUNITY                0.00     12.81      2.93      2.56
      AFLOAT ASSIGNMENTS          23.38     17.88     11.21      9.39
      PROFESSIONAL EDUCATION        .00      4.68      4.68      4.68
      OTHER                       38.00     75.82     33.64     28.08

    **************************************************************

      LOWER GRADE FILLS                      0.00      0.00      0.00

    **************************************************************

         PRESS ENTER TO RETURN TO OUTPUT MENU
```

REQUIREMENTS DISPLAY OUTPUT SCREEN (IN-PROCESS MONITORING)

This display appears when the PF-3 key is pressed while the Output Menu screen appears. It shows the requirements remaining to be filled for each grade in each activity at the current point in processing. To print this screen, press PF-11. To get back to the Output Menu screen press "ENTER".

S22

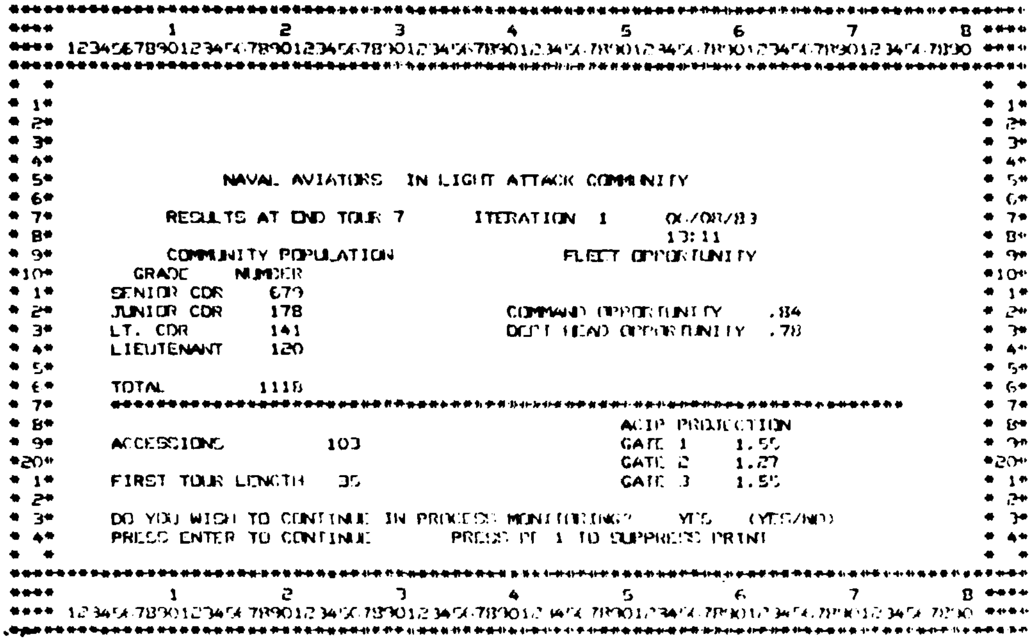


```
****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
****************************************************************************************
*  *                                                                              *  *
* 1*                                                                              * 1*
* 2*                                                                              * 2*
* 3*                           ELAPSED TIME (07) DISPLAY                          * 3*
* 4*                                                                              * 4*
* 5*                                                                              * 5*
* 6*                                                                              * 6*
* 7*                                           TOUR                               * 7*
* 8*            ACTIVITY                      1     2     3     4     5     6     7 * 8*
* 9*                                                                              * 9*
*10*       FLEET TOURS                       42    67     0     0     0     0     0 *10*
* 1*       FLEET READINESS SQUADRON           0    79     0     0     0     0     0 * 1*
* 2*       TRAINING COMMAND                  25    79     0     0     0     0     0 * 2*
* 3*       RND COMMUNITY                      0    79     0     0     0     0     0 * 3*
* 4*       AFLOAT ASSIGNMENTS                 0    67     0     0     0     0     0 * 4*
* 5*       PROFESSIONAL EDUCATION             0    67     0     0     0     0     0 * 5*
* 6*       OTHER                              0    79     0     0     0     0     0 * 6*
* 7*                                                                              * 7*
* 8*     ****************************************************************         * 8*
* 9*                                                                              * 9*
*20*       NON-AVIATION MAN YEARS           0.0   4.2   0.0   0.0   0.0   0.0   0.0 *20*
* 1*                                                                              * 1*
* 2*     ****************************************************************         * 2*
* 3*                                                                              * 3*
* 4*         PRESS ENTER TO RETURN TO OUTPUT MENU                                 * 4*
*  *                                                                              *  *
****************************************************************************************
****          1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
****************************************************************************************
```

EXCESS FLOW SCREEN (IN-PROCESS MONITORING)

If PF-4 was pressed when screen S17 was displayed, the above screen would appear. It shows the excess flows out of nodes that the model could not assign up to this point in processing. To print this screen, press PF-11. Press "ENTER" to return to the Output Menu screen S17.

S23



```
**************************************************************************************
****         1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
**************************************************************************************
*  *                                                                              *  *
* 1*                                                                              * 1*
* 2*                                                                              * 2*
* 3*                                                                              * 3*
* 4*                                                                              * 4*
* 5*                NAVAL AVIATORS  IN LIGHT ATTACK COMMUNITY                      * 5*
* 6*                                                                              * 6*
* 7*           RESULTS AT END TOUR 7       ITERATION  1      06/08/83              * 7*
* 8*                                                           13:11               * 8*
* 9*           COMMUNITY POPULATION                FLEET OPPORTUNITY               * 9*
*10*         GRADE     NUMBER                                                     *10*
* 1*       SENIOR CDR      679                                                    * 1*
* 2*       JUNIOR CDR      178              COMMAND OPPORTUNITY     .84           * 2*
* 3*       LT. CDR         141              DEPT HEAD OPPORTUNITY   .78           * 3*
* 4*       LIEUTENANT      120                                                    * 4*
* 5*                                                                              * 5*
* 6*       TOTAL          1118                                                    * 6*
* 7*       ****************************************************************       * 7*
* 8*                                                   ACIP PROJECTION            * 8*
* 9*       ACCESSIONS           103                    GATE 1     1.55            * 9*
*20*                                                   GATE 2     1.27            *20*
* 1*       FIRST TOUR LENGTH     35                    GATE 3     1.55            * 1*
* 2*                                                                              * 2*
* 3*       DO YOU WISH TO CONTINUE IN PROCESS MONITORING?     YES    (YES/NO)      * 3*
* 4*       PRESS ENTER TO CONTINUE        PRESS PF 1 TO SUPPRESS PRINT            * 4*
*  *                                                                              *  *
**************************************************************************************
****         1         2         3         4         5         6         7         8 ****
**** 12345678901234567890123456789012345678901234567890123456789012345678901234567890 ****
**************************************************************************************
```

RESULTS/CONTINUE SCREEN

This screen is displayed automatically when the solution criteria for the model is set. It displays the final results of model processing. This screen also allows the user to discontinue the IN-PROCESS MONITORING by typing "NO" over "YES" for IN-PROCESS MONITORING. To suppress printing these results, press PF-1. To continue processing and print these results, press "ENTER".

SAMPLE OUTPUTS

The following pages present a complete set of output print-outs for a run made with all model parameters set to default values.

```
                                   SUMMARY DATA

                          LIGHT ATTACK  COMMUNITY                                                   GROUP A
                               NAVAL AVIATORS                                                       05/20/83
                                                                                                    15:00

**************************************************************************************************

   RETENTION            45 %                                NUMBER OF SQUADRONS           24
                                                            AIRCRAFT PER SQUADRON         12
   PLOWBACK FRACTION     5 %                                CREW FACTOR                    1.42
                                                            NAVAL AVIATORS PER CREW        1.00

**************************************************************************************************

                                        COMMUNITY POPULATION

   ACCESSIONS TO TRAINING (139X)     163      SENIOR COMMANDERS     110
                                              COMMANDERS            149          COMMAND OPPORTUNITY       .73
   ACCESSIONS TO 131X DESIGNATOR     116      LT. COMMANDERS        201          DEPT HEAD OPPORTUNITY     .84
   FIRST TOUR LENGTH                  31      LIEUTENANTS           759

                                                   TOTALS          1219

**************************************************************************************************

                         DISTRIBUTION BY GRADE AND ACTIVITY

                ACTIVITY                     GRADE
                                 LT      LCDR     CDR    SEN CDR   TOTAL           ACIP PROJECTIONS
      FLEET TOURS                387     102       45      25       560
      FLEET READINESS SQUADRON    96      15        6       0       118           GATE  1     1.47
      TRAINING COMMAND           103      12        6       0       121           GATE  2     1.19
      R&D COMMUNITY               21       9        6       3        40           GATE  3     1.45
      AFLOAT ASSIGNMENTS          22       5       15      19        60
      PROFESSIONAL EDUCATION      22       3        9       5        39
      OTHER                       67      35       62      44       208
      NON AVIATION ASSIGNMENTS    41      20        0      13        74      NON AVIATION        6 %

      ====================================================================================
      LOWER GRADE FILLS                   52        0                          HI UP DETAIL  (LCDR)   20%
      ====================================================================================

**************************************************************************************************

                     TOTAL ANNUAL PCS MOVES THIS COMMUNITY          507

**************************************************************************************************

ALL REQUIREMENTS MET                  DEFAULT RUN FLT TOURS 4.5 = 30 MOS.                 ITERATIONS =  17 6
```

Reproduced from best available copy.

```
                                          SUMMARY DATA

                                        FIGHTER  COMMUNITY
                                         NAVAL  AVIATORS                                       GROUP  A
                                                                                               05/20/83
                                                                                               15:01
****************************************************************************************************

      RETENTION              45 %
                                                            NUMBER OF SQUADRONS             24
      PLOWBACK FRACTION       5 %                          AIRCRAFT PER SQUADRON           12
                                                           CREW FACTOR                      1.17
                                                           NAVAL AVIATORS PER CREW          1.00
****************************************************************************************************

                                             COMMUNITY POPULATION

      ACCESSIONS TO TRAINING (130X)     129       SENIOR COMMANDERS      87
                                                  COMMANDERS            126                COMMAND OPPORTUNITY        .39
      ACCESSIONS TO 131X DESIGNATOR      92       LT. COMMANDERS        170                DEPT HEAD OPPORTUNITY      .85
      FIRST TOUR LENGTH                  37       LIEUTENANTS           605

                                                          TOTALS        988
****************************************************************************************************

                    DISTRIBUTION BY GRADE AND ACTIVITY

               ACTIVITY                            GRADE
                                         LT      LCDR      CDR     SEN CDR   TOTAL            ACIP PROJECTIONS
        FLEET TOURS                     327       73        7        26       432
        FLEET READINESS SQUADRON        147        3       22         2       174           GATE  1      1.58
        TRAINING COMMAND                 81       10        4         1        96           GATE  2      1.27
        RND COMMUNITY                     4       21        5         1        31           GATE  3      1.55
        AFLOAT ASSIGNMENTS               11       18        9         9        47
        PROFESSIONAL EDUCATION           11        8        4         4        28
        OTHER                            24       39       74        28       165
        NON-AVIATION ASSIGNMENTS          0        0        0        18        18        NON-AVIATION           2 %
        ================================================================================================
        LOWER GRADE FILLS                          6        3
        ===========================================================          FIT UP DETAIL  (LCDR)    4%
                                                                 ===================================
****************************************************************************************************

                   TOTAL ANNUAL PCS MOVES THIS COMMUNITY          427

****************************************************************************************************
ALL REQUIREMENTS MET                  DEFAULT RUN FLT TOURS 4.5 - 30 MOS.               ITERATIONS =  17 1
```

```
                                    SUMMARY DATA

                              MEDIUM ATTACK  COMMUNITY
                                 NAVAL  AVIATORS                                           GROUP A
                                                                                           05/20/83
                                                                                           15:01
******************************************************************************************

      RETENTION            45 %                              NUMBER OF SQUADRONS          12
                                                            AIRCRAFT PER SQUADRON        14
      PLOWBACK FRACTION     5 %                             CREW FACTOR                   1.14
                                                            NAVAL AVIATORS PER CREW       1.00

******************************************************************************************

                                             COMMUNITY POPULATION

      ACCESSIONS TO TRAINING (139X)     65        SENIOR COMMANDERS      49
                                                  COMMANDERS             66       COMMAND OPPORTUNITY      .38
      ACCESSIONS TO 131X DESIGNATOR     46        LT. COMMANDERS         86       DEPT HEAD OPPORTUNITY    .85
      FIRST TOUR LENGTH                 43        LIEUTENANTS           303

                                                        TOTALS          504

******************************************************************************************

                    DISTRIBUTION BY GRADE AND ACTIVITY

            ACTIVITY                          GRADE
                                LT      LCDR     CDR    SEN CDR   TOTAL            ACIP PROJECTIONS
        FLEET TOURS             186      36        5       12      240
        FLEET READINESS SQUADRON 47       3        1        1       53              GATE  1      1.57
        TRAINING COMMAND         41       5        2        1       49              GATE  2      1.22
        R&D COMMUNITY             9       5        2        1       18              GATE  3      1.49
        AFLOAT ASSIGNMENTS        5       8        7        6       27
        PROFESSIONAL EDUCATION    5       5        4        2       15
        OTHER                     9      24       45       15       93
        NON AVIATION ASSIGNMENTS  0       0        0       11       11       NON AVIATION           2 %

        ====================================================================================
        LOWER GRADE FILLS                 5        0                         HI UP DETAIL (LCDR)     6%
        ====================================================================================

******************************************************************************************

                    TOTAL ANNUAL PCS MOVES THIS COMMUNITY           216

******************************************************************************************

ALL REQUIREMENTS MET                 DEFAULT RUN FLT TOURS 4.5 - 30 MOS.              ITERATIONS =  17.0
```

```
                                          SUMMARY DATA

                                ELECTRONIC WARFARE  COMMUNITY
                                       NAVAL AVIATORS                                             GROUP 6
                                                                                                  05/20/83
************************************************************************************************  15:03
   RETENTION            45 %
                                                            NUMBER OF SQUADRONS          9
   PLOWBACK FRACTION     5 %                               AIRCRAFT PER SQUADRON        4
                                                            CREW FACTOR                  1.50
                                                            NAVAL AVIATORS PER CREW      1.00
************************************************************************************************

                                          COMMUNITY POPULATION
   ACCESSIONS TO TRAINING (139X)      32
                                          SENIOR COMMANDERS       23
   ACCESSIONS TO 131X DESIGNATOR      23  COMMANDERS              32     COMMAND OPPORTUNITY      .83
   FIRST TOUR LENGTH                  27  LT. COMMANDERS          44     DEPT HEAD OPPORTUNITY    .80
                                          LIEUTENANTS            152

                                            TOTALS               251
************************************************************************************************

                    DISTRIBUTION BY GRADE AND ACTIVITY
          ACTIVITY
                                              GRADE
                                  LT     LCDR     CDR    SEN CDR   TOTAL
     FLEET TOURS                  69      22      13        1       105          ACIP PROJECTIONS
     FLEET READINESS SQUADRON     41       1       0        0        42
     TRAINING COMMAND             20       2       1        0        24        GATE  1     1.61
     RND COMMUNITY                 4       3       1        0         7        GATE  2     1.24
     AFLOAT ASSIGNMENTS            4       1       4        0         9        GATE  3     1.51
     PROFESSIONAL EDUCATION        4       2       1        1         8
     OTHER                        10      12      11        6        39
     NON-AVIATION ASSIGNMENTS      0       0       2       15        16     NON AVIATION        6 %
     ===============================================================================
     LOWER GRADE FILLS                     9       1
     ===============================================================================  FIT UP DETAIL (LCDR)   18%
************************************************************************************************

                    TOTAL ANNUAL PCS MOVES THIS COMMUNITY          109
************************************************************************************************
ALL REQUIREMENTS MET
                              DEFAULT RUN FLT TOURS 4,5 - 30 MOS.
                                                                               ITERATIONS -  17 1
                                          SUMMARY DATA

                                CARRIER BASED AEW  COMMUNITY                                    GROUP A
                                     NAVAL  AVIATORS                                            05/20/83
                                                                                                15:01

****************************************************************************************************

      RETENTION               45 %                          NUMBER OF SQUADRONS          11
                                                           AIRCRAFT PER SQUADRON         9
      PLOWBACK FRACTION        5 %                         CREW FACTOR                   1.44
                                                           NAVAL AVIATORS PER CREW       1.50

****************************************************************************************************

                                           COMMUNITY POPULATION

      ACCESSIONS TO TRAINING (139X)      70        SENIOR COMMANDERS      50
                                                   COMMANDERS             72          COMMAND OPPORTUNITY       .33
      ACCESSIONS TO 131X DESIGNATOR      50        LT. COMMANDERS         93          DEPT HEAD OPPORTUNITY     .32
      FIRST TOUR LENGTH                  43        LIEUTENANTS           329

                                                         TOTALS          544

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                     DISTRIBUTION BY GRADE AND ACTIVITY

              ACTIVITY                          GRADE
                                    LT      LCDR      CDR    SEN CDR   TOTAL               ACIP PROJECTIONS
         FLEET TOURS               202       42        5       12      261
         FLEET READINESS SQUADRON   51        4        2        1       58              GATE  1      1.58
         TRAINING COMMAND           45        6        2        1       53              GATE  2      1.23
         RND COMMUNITY              10        4        4        1       19              GATE  3      1.51
         AFLOAT ASSIGNMENTS          6        7        8        6       28
         PROFESSIONAL EDUCATION      6        5        6        0       17
         OTHER                      10       26       45       17       98
         NON AVIATION ASSIGNMENTS    0        0        0       12       12         NON AVIATION           2 %

         =================================================================================================
         LOWER GRADE FILLS                    7        0                           FIT UP DETAIL  (LCDR)   7%
         =================================================================================================

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                     TOTAL ANNUAL PCS MOVES THIS COMMUNITY          232

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  ALL REQUIREMENTS MET                    DEFAULT RUN FLT TOURS 4.5 - 30 MOS.                 ITERATIONS =  17.0
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                                                    SUMMARY DATA

                                    FORCE SUPPORT     13X   COMMUNITY                                                   GROUP A
                                                NAVAL AVIATORS                                                          05/20/83
                                                                                                                        15:04

*************************************************************************************************************************

      RETENTION                45 %                                    NUMBER OF SQUADRONS            13
                                                                      AIRCRAFT PER SQUADRON           0
      FLOWBACK FRACTION         5 %                                   CREW FACTOR                     0.00
                                                                      NAVAL AVIATORS PER CREW         0.00

*************************************************************************************************************************


                                                    COMMUNITY POPULATION

      ACCESSIONS TO TRAINING (13XX)      124        SENIOR COMMANDERS       84
                                                    COMMANDERS             112          COMMAND OPPORTUNITY         .36
      ACCESSIONS TO 13XX DESIGNATOR       88        LT. COMMANDERS         152          DEPT HEAD OPPORTUNITY       .34
      FIRST TOUR LENGTH                   35        LIEUTENANTS            576

                                                         TOTALS            924

*************************************************************************************************************************


                         DISTRIBUTION BY GRADE AND ACTIVITY

               ACTIVITY                              GRADE
                                          LT      LCDR      CDR     SEN CDR   TOTAL                  ACIP PROJECTIONS
         FLEET TOURS                     317       83        23        14      437
         FLEET READINESS SQUADRON          0        0         0         0        0               GATE  1        1.32
         TRAINING COMMAND                 78       10         5         0       93               GATE  2        1.06
         R&D COMMUNITY                    23        6         2         3       33               GATE  3        1.30
         AFLOAT ASSIGNMENTS               14        6        17         8       46
         PROFESSIONAL EDUCATION           17        4         4         4       30
         OTHER                            58       24        60        33      175
         NON AVIATION ASSIGNMENTS         68       19         0        21      108       NON AVIATION           12 %

         ===================================================================================================
         LOWER GRADE FILLS                         39         1                           HI UP DETAIL (LCDR)    20%
         ===================================================================================================

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                         TOTAL ANNUAL PCS MOVES THIS COMMUNITY           437

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ALL REQUIREMENTS MET                        DEFAULT FOR FLT TOURS 4.5 = 30 MOS.                    ITERATIONS = [illegible]
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                                        SUMMARY DATA

                                  EARLY WARNING  COMMUNITY                                                      GROUP B
                                       NAVAL  AVIATORS                                                          05/20/83
                                                                                                                15:04
****************************************************************************************************************************

      RETENTION             45 %                                NUMBER OF SQUADRONS             12
                                                               AIRCRAFT PER SQUADRON            3
      PLOWBACK FRACTION      5 %                               CREW FACTOR                      1.00
                                                               NAVAL AVIATORS PER CREW          2.00

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                                               COMMUNITY POPULATION

      ACCESSIONS TO TRAINING (139X)     37        SENIOR COMMANDERS      27
                                                  COMMANDERS             42          COMMAND OPPORTUNITY       .73
      ACCESSIONS TO 131X DESIGNATOR     23        LT. COMMANDERS         51          DEPT HEAD OPPORTUNITY     .84
      FIRST TOUR LENGTH                 38        LIEUTENANTS           189

                                                       TOTALS           309

****************************************************************************************************************************

                      DISTRIBUTION BY GRADE AND ACTIVITY

                ACTIVITY                        GRADE
                                      LT     LCDR    CDR   SEN CDR  TOTAL                    ACIP PROJECTIONS
         FLEET TOURS                 110      27      15       3     155
         FLEET READINESS SQUADRON     37       4       1       0      42                   GATE   1      1.56
         TRAINING COMMAND             13       1       1       0      15                   GATE   2      1.25
         R&D COMMUNITY                 6       3       1       2      12                   GATE   3      1.53
         AFLOAT ASSIGNMENTS            5       1       5       6      17
         PROFESSIONAL EDUCATION        6       1       2       1      10
         OTHER                        12      13      17      13      55
         NON AVIATION ASSIGNMENTS      0       0       0       2       3            NON AVIATION           1 %

         ==========================================================================================================
         LOWER GRADE FILLS                    13       0                            HI UP DETAIL (LCDR)    19%
         ==========================================================================================================

****************************************************************************************************************************

                          TOTAL ANNUAL PCS MOVES THIS COMMUNITY          123

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ALL REQUIREMENTS MET                          DEFAULT RUN FLT TOURS 4.5 = 30 MOS.                  ITERATIONS =  17.0
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                                              SUMMARY DATA

                                   MARITIME PATROL  COMMUNITY                                      GROUP D
                                       NAVAL  AVIATORS                                             05/20/83
                                                                                                   15:08

**************************************************************************************************************

      RETENTION            45 %                                   NUMBER OF SQUADRONS             24
                                                                AIRCRAFT PER SQUADRON            9
      PLOWBACK FRACTION     5 %                                 CREW FACTOR                      1.33
                                                                NAVAL AVIATORS PER CREW          3.00

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                                              COMMUNITY POPULATION

      ACCESSIONS TO TRAINING (139X)     230    SENIOR COMMANDERS    202
                                               COMMANDERS           261        COMMAND OPPORTUNITY       .21
      ACCESSIONS TO 131X DESIGNATOR     224    LT. COMMANDERS       381        DEPT HEAD OPPORTUNITY     .42
      FIRST TOUR LENGTH                  43    LIEUTENANTS         1469

                                                    TOTALS         2313

**************************************************************************************************************

                       DISTRIBUTION BY GRADE AND ACTIVITY

                 ACTIVITY                         GRADE
                                        LT     LCDR     CDR    SEN CDR   TOTAL              ACIP PROJECTIONS
        FLEET TOURS                    922     132       0       29      1083
        FLEET READINESS SQUADRON        88       6       1        1        96               GATE  1     1.35
        TRAINING COMMAND               103      10       3        4       119               GATE  2     1.02
        R&D COMMUNITY                   43      28       9        3        83               GATE  3     1.25
        AFLOAT ASSIGNMENTS              20      49      12       43       124
        PROFESSIONAL EDUCATION          43      13      14        5        76
        OTHER                          146      57     169       67       439
        NON-AVIATION ASSIGNMENTS       105      85      54       49       293         NON AVIATION          13 %

        ======================================================================================
        LOWER GRADE FILLS                       75      28                             FIT UP DETAIL (LCDR)   20%
        ======================================================================================

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                    TOTAL ANNUAL PCS MOVES THIS COMMUNITY           957

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ALL REQUIREMENTS MET                     DEFAULT RUN FLT TOURS 4.5 - 30 MOS.                   ITERATIONS = 247.0
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                                    SUMMARY DATA

                         ELECTRONIC WARFARE   VQ  COMMUNITY                              GROUP B
                                  NAVAL AVIATORS                                         09/23/83
                                                                                         15:02
******************************************************************************************************

     RETENTION             45 %                             NUMBER OF SQUADRONS            4
                                                            AIRCRAFT PER SQUADRON          0
     PLOWBACK FRACTION      5 %                             CREW FACTOR                    0.00
                                                            NAVAL AVIATORS PER CREW        0.00

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                                         COMMUNITY POPULATION

     ACCESSIONS TO TRAINING (100%)      45     SENIOR COMMANDERS      31
                                               COMMANDERS             44      COMMAND OPPORTUNITY      .15
     ACCESSIONS TO 131X DESIGNATOR      15     LT. COMMANDERS         60      DEPT HEAD OPPORTUNITY    .50
     FIRST TOUR LENGTH                  42     LIEUTENANTS           227

                                                    TOTALS           362

******************************************************************************************************

                         DISTRIBUTION BY GRADE AND ACTIVITY

              ACTIVITY                          GRADE
                                    LT     LCDR     CDR    SEN CDR   TOTAL                ACIP PROJECTIONS
       FLEET TOURS                 140      21       2        3       166
       FLEET READINESS SQUADRON      0       0       0        0         0                  GATE  1      1.24
       TRAINING COMMAND             16       2       1        0        18                  GATE  2       .94
       RND COMMUNITY                 8       1       3        0        13                  GATE  3      1.15
       AFLOAT ASSIGNMENTS            3       7       4        4        19
       PROFESSIONAL EDUCATION        7       2       3        0        12
       OTHER                        22      10      26        9        67
       NON AVIATION ASSIGNMENTS     31      18       6       13        68          NON AVIATION       19 %

       =================================================================================================
       LOWER GRADE FILLS                    11       6                             HIT UP DETAIL (LCDR)   20%
       =================================================================================================

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                          TOTAL ANNUAL PCS MOVES, THIS COMMUNITY         182

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ALL REQUIREMENTS MET                     DEFAULT FOR FLEET TOURS 4.5 = 30 MOS.                 ITERATIONS
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                                                  SUMMARY DATA

                                        FORCE SUPPORT   PERS  COMMUNITY                                    GROUP B
                                                NAVAL AVIATORS                                            05/25/83
                                                                                                          15:03
**********************************************************************************************************************

          RETENTION               45 %                                   NUMBER OF SQUADRONS          2
                                                                          AIRCRAFT PER SQUADRON        6
          FLOWBACK FRACTION        5 %                                   CREW FACTOR                  0.00
                                                                          NAVAL AVIATORS PER CREW      0.00

**********************************************************************************************************************

                                                 COMMUNITY POPULATION

          ACCESSIONS TO TRAINING (133X)      15      SENIOR COMMANDERS     13
                                                     COMMANDERS            15         COMMAND OPPORTUNITY       .24
          ACCESSIONS TO 131X DESIGNATOR      11      LT. COMMANDERS        19         DEPT HEAD OPPORTUNITY     .70
          FIRST TOUR LENGTH                  42      LIEUTENANTS           74

                                                         TOTALS           121

**********************************************************************************************************************

                            DISTRIBUTION BY GRADE AND ACTIVITY

                      ACTIVITY                          GRADE
                                            LT      LCDR     CDR     SEN CDR   TOTAL                ACIP PROJECTIONS
             FLEET TOURS                    46       10       2         1       59
             FLEET READINESS SQUADRON        0        0       0         0        0                GATE  1      1.31
             TRAINING COMMAND                5        1       0         0        6                GATE  2      1.01
             RND COMMUNITY                   3        1       1         0        4                GATE  3      1.24
             AFLOAT ASSIGNMENTS              1        2       2         1        7
             PROFESSIONAL EDUCATION          2        1       1         0        4
             OTHER                           8        3       8         5       24
             NON-AVIATION ASSIGNMENTS        9        3       0         5       17           NON AVIATION          14 %

             ================================================================================================
             LOWER GRADE FILLS                        5       0                                HT UP DETAIL (LCDR)   20%
             ================================================================================================

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                         TOTAL ANNUAL PCS MOVES THIS COMMUNITY             59

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      ALL REQUIREMENTS MET                        DEFAULT DUR FLT TOURS 4.5 = 30 MOS                   ITERATIONS =  17 2
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                                     SUMMARY DATA

                             HELICOPTER ASW COMMUNITY                                              GROUP C
                                  NAVAL AVIATORS                                                   05/20/83
                                                                                                   15:11
*******************************************************************************************************

    RETENTION            45 %                                     NUMBER OF SQUADRONS       11
                                                                 AIRCRAFT PER SQUADRON      6
    PLOWBACK FRACTION     5 %                                    CREW FACTOR               1.60
                                                                 NAVAL AVIATORS PER CREW   2.00

*******************************************************************************************************

                                              COMMUNITY POPULATION

    ACCESSIONS TO TRAINING (139X)     79     SENIOR COMMANDERS     59
                                             COMMANDERS            79          COMMAND OPPORTUNITY     .72
    ACCESSIONS TO 131X DESIGNATOR     59     LT. COMMANDERS       104          DEPT HEAD OPPORTUNITY   .79
    FIRST TOUR LENGTH                 34     LIEUTENANTS          385

                                                 TOTALS           627

*******************************************************************************************************

                      DISTRIBUTION BY GRADE AND ACTIVITY

          ACTIVITY                          GRADE
                                  LT    LCDR    CDR    SEN CDR   TOTAL              ACIP PROJECTIONS
      FLEET TOURS                209     53      22      13       297
      FLEET READINESS SQUADRON    63     13       2       0        78              GATE  1      1.49
      TRAINING COMMAND            33      3       1       0        37              GATE  2      1.20
      RND COMMUNITY               11      4       5       1        21              GATE  3      1.46
      AFLOAT ASSIGNMENTS          11      3       9       9        32
      PROFESSIONAL EDUCATION      11      1       5       3        20
      OTHER                       34     17      33      24       108
      NON AVIATION ASSIGNMENTS    13     10       1       9        33          NON AVIATION          5 %

      ===================================================================================================
      LOWER GRADE FILLS                  27       0                            LT UP DETAIL (LCDR)   20%
      ===================================================================================================

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                  TOTAL ANNUAL PCS MOVES THIS COMMUNITY          256

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ALL REQUIREMENTS MET                   DEFAULT RUN FLT TOURS 4.5 = 30 MOS.                 ITERATIONS = 17 3
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                                             SUMMARY DATA

                                      LAMPS MK I  COMMUNITY                                                       GROUP C
                                         NAVAL AVIATORS                                                           05/20/83
                                                                                                                   15:33

**************************************************************************************************************************

        RETENTION              45 %                                    NUMBER OF SQUADRONS          6
                                                                      AIRCRAFT PER SQUADRON       11
        PLOWBACK FRACTION       5 %                                   CREW FACTOR                  2.00
                                                                      NAVAL AVIATORS PER CREW      2.00

**************************************************************************************************************************

                                                  COMMUNITY POPULATION

        ACCESSIONS TO TRAINING (13X)       73         SENIOR COMMANDERS      66
                                                      COMMANDERS             82          COMMAND OPPORTUNITY        .30
        ACCESSIONS TO 131X DESIGNATOR      59         LT. COMMANDERS        112          DEPT HEAD OPPORTUNITY      .65
        FIRST TOUR LENGTH                  49         LIEUTENANTS           385

                                                           TOTALS           645

**************************************************************************************************************************

                           DISTRIBUTION BY GRADE AND ACTIVITY

                    ACTIVITY                         GRADE
                                          LT       LCDR      CDR     SEN CDR   TOTAL                  ACIP PROJECTIONS
           FLEET TOURS                   204        30         6        13      313
           FLEET READINESS SQUADRON       55         4        13         3       75                GATE  1        1.53
           TRAINING COMMAND               33         3         1         1       38                GATE  2        1.12
           RND COMMUNITY                  12         8         2         1       23                GATE  3        1.46
           AFLOAT ASSIGNMENTS              6        15         5        10       36
           PROFESSIONAL EDUCATION          8         6         4         1       20
           OTHER                           8        42        49        25      125
           NON AVIATION ASSIGNMENTS        0         5         1        10       16         NON AVIATION           2 %

           ==================================================================================================
           LOWER GRADE FILLS                         7         3                             FIT UP DETAIL (LCDR)     67
           ==================================================================================================

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                          TOTAL ANNUAL PCS MOVES THIS COMMUNITY              259

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ALL REQUIREMENTS MET                           DEFAULT FOR FLEET TOURS 4.5    30 MOS                       ITERATIONS     5/0
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                                              SUMMARY DATA

                                         LAMPS MK III  COMMUNITY                                                  GROUP C
                                            NAVAL  AVIATORS                                                        05/20/83
                                                                                                                   [illegible]
*************************************************************************************************************************
      RETENTION              45 %                                    NUMBER OF SQUADRONS          8
                                                                    AIRCRAFT PER SQUADRON        [illegible]
      PLOWBACK FRACTION        5 %                                   CREW FACTOR                  2.00
                                                                    NAVAL AVIATORS PER CREW      2.00
*************************************************************************************************************************

                                                 COMMUNITY POPULATION

      ACCESSIONS TO TRAINING (139X)      102     SENIOR COMMANDERS      106
                                                 COMMANDERS             158        COMMAND OPPORTUNITY      .20
      ACCESSIONS TO 131X DESIGNATOR      120     LT. COMMANDERS         205        DEPT HEAD OPPORTUNITY   1.00
      FIRST TOUR LENGTH                   34     LIEUTENANTS            787

                                                      TOTALS           1256
*************************************************************************************************************************

                        DISTRIBUTION BY GRADE AND ACTIVITY

                ACTIVITY                         GRADE
                                       LT     LCDR     CDR     SEN CDR    TOTAL                 ACIP PROJECTIONS
         FLEET TOURS                  426      112      32        11       580
         FLEET READINESS SQUADRON      48        5       0         0        54                GATE  1      1.31
         TRAINING COMMAND              67        5       3         0        76                GATE  2      1.04
         R&D COMMUNITY                 22       15       4         2        42                GATE  3      1.27
         AFLOAT ASSIGNMENTS            20        7      13        11        57
         PROFESSIONAL EDUCATION        23        6      12         0        41
         OTHER                         75       28      88        35       226
         NON AVIATION ASSIGNMENTS     106       27       0        48       181          NON AVIATION         14 %
         ========================================================================================================
         LOWER GRADE FILLS                      54       2                                 FIT UP DETAIL (CODE)   .20
         ========================================================================================================
*************************************************************************************************************************

                        TOTAL ANNUAL PCS MOVES THIS COMMUNITY            543

*************************************************************************************************************************
   ALL REQUIREMENTS MET                         DEFAULT CONFLICT TOURS ALL = 30 MOS                    [illegible]
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                                   SUMMARY DATA

                          FORCE SUPPORT  HELO  COMMUNITY                                  [illegible]
                                  NAVAL AVIATORS                                          [illegible]
                                                                                          [illegible]

*************************************************************************************************

     RETENTION                45 %                         NUMBER OF SQUADRONS              8
                                                           AIRCRAFT PER SQUADRON            0
     PLOWBACK FRACTION         5 %                         CREW FACTOR                      0.00
                                                           NAVAL AVIATORS PER CREW          0.00

*************************************************************************************************

                                              COMMUNITY POPULATION

     ACCESSIONS TO TRAINING (130X)      120      SENIOR COMMANDERS        81
                                                 COMMANDERS              112       COMMAND OPPORTUNITY      .36
     ACCESSIONS TO 131X DESIGNATOR       89      LT. COMMANDERS          158       DEPT HEAD OPPORTUNITY    .63
     FIRST TOUR LENGTH                   39      LIEUTENANTS             584

                                                      TOTALS             935

*************************************************************************************************

                         DISTRIBUTION BY GRADE AND ACTIVITY

              ACTIVITY                            GRADE
                                         LT      LCDR     CDR    SEN CDR   TOTAL              ACIP PROJECTIONS
        FLEET TOURS                     341       67       8       11       428
        FLEET READINESS SQUADRON          0        0       0        0         0            GATE  1      1.22
        TRAINING COMMAND                 50        3       1        0        55            GATE  2       .95
        R&D COMMUNITY                    18        2       5        1        26            GATE  3      1.16
        AFLOAT ASSIGNMENTS                9       15       8        8        40
        PROFESSIONAL EDUCATION           17        7       4        2        30
        OTHER                            47       28      51       15       140
        NON-AVIATION ASSIGNMENTS        102       35      34       44       216      NON AVIATION            23 %

        =========================================================================================
        LOWER GRADE FILLS                         28      11                          FILL UP DETAIL (LCDR)   20%
        =========================================================================================

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                    TOTAL ANNUAL PCS MOVES THIS COMMUNITY            485

*************************************************************************************************

ALL REQUIREMENTS MET                    DEFAULT RUN FLT TOURS 4.5 = 30 MOS.                ITERATIONS = [illegible]
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                                          SUMMARY DATA

                                        FIGHTER  COMMUNITY                                          GROUP D
                                      NAVAL FLIGHT OFFICERS                                         05/20/81
                                                                                                    15:15
**********************************************************************************************************

    RETENTION            45 %                                   NUMBER OF SQUADRONS           24
                                                               AIRCRAFT PER SQUADRON         12
    PLOWBACK FRACTION     5 %                                  CREW FACTOR                     1.17
                                                               NAVAL FLIGHT OFFICERS PER CREW  1.00

**********************************************************************************************************

                                        COMMUNITY POPULATION

    ACCESSIONS TO TRAINING (132X)     120       SENIOR COMMANDERS     72
                                                COMMANDERS            93          COMMAND OPPORTUNITY      .55
    ACCESSIONS TO 132X DESIGNATOR      70       LT. COMMANDERS       122          DEPT HEAD OPPORTUNITY    .26
    FIRST TOUR LENGTH                  49       LIEUTENANTS          461

                                                    TOTALS           748

**********************************************************************************************************

                        DISTRIBUTION BY GRADE AND ACTIVITY

             ACTIVITY                            GRADE
                                      LT    LCDR    CDR    SEN CDR   TOTAL                ACIP PROJECTIONS
       FLEET TOURS                   316     52      9       29       406
       FLEET READINESS SQUADRON       82      4     11        3       100                GATE  1      1.54
       TRAINING COMMAND               19      2      0        1        22                GATE  2      1.24
       R&D COMMUNITY                  14      5      1        1        21                GATE  3      1.52
       AFLOAT ASSIGNMENTS              6     10      5        4        25
       PROFESSIONAL EDUCATION         12      2      9        1        24
       OTHER                          12     47     58       19       136
       NON-AVIATION ASSIGNMENTS        0      0      0       14        14        NON AVIATION          2 %

       ===========================================================================================
       LOWER GRADE FILLS                      6      0                           FIT UP DETAIL (LCDR)   5%
       ===========================================================================================

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                        TOTAL ANNUAL PCS MOVES THIS COMMUNITY         373

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ALL REQUIREMENTS MET                        DEFAULT RUN FLT TOURS 4.5 = 30 MOS.                ITERATIONS =  17 1
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                                        SUMMARY DATA

                                 MEDIUM ATTACK  COMMUNITY                                              GROUP E
                                  NAVAL FLIGHT OFFICERS                                                05/20/83
                                                                                                       15:16
**********************************************************************************************************

      RETENTION             45 %                                NUMBER OF SQUADRONS             12
                                                               AIRCRAFT PER SQUADRON            14
      FLOWBACK FRACTION      5 %                               CREW FACTOR                       1.14
                                                               NAVAL FLIGHT OFFICERS PER CREW   1.00

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                                         COMMUNITY POPULATION

      ACCESSIONS TO TRAINING (137X)      77       SENIOR COMMANDERS      42
                                                  COMMANDERS             54         COMMAND OPPORTUNITY       .54
      ACCESSIONS TO 132X DESIGNATOR      43       LT. COMMANDERS         74         DEPT HEAD OPPORTUNITY     .53
      FIRST TOUR LENGTH                  45       LIEUTENANTS           283

                                                         TOTALS         453

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                       DISTRIBUTION BY GRADE AND ACTIVITY

              ACTIVITY                          GRADE
                                    LT      LCDR     CDR    SEN CDR   TOTAL                ACIP PROJECTIONS
         FLEET TOURS               183       27       3       13       226
         FLEET READINESS SQUADRON   34        4       2        1        40                GATE  1      1.33
         TRAINING COMMAND            7        1       0        0         8                GATE  2      1.08
         R&D COMMUNITY               8        3       1        0        12                GATE  3      1.33
         AFLOAT ASSIGNMENTS          3       10       3        2        17
         PROFESSIONAL EDUCATION      8        2       4        0        15
         OTHER                      32        9      28        8        77
         NON-AVIATION ASSIGNMENTS    8       20      13       18        58         NON AVIATION         13 %

         ========================================================================================
         LOWER GRADE FILLS                   14       5                              FIT UP DETAIL (LCDR)   20%
         ========================================================================================

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                       TOTAL ANNUAL PCS MOVES THIS COMMUNITY        223

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ALL REQUIREMENTS MET                       DEFAULT RUN FLT TOURS 4,5 = 30 MOS.                   ITERATIONS = [illegible]
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                                                SUMMARY DATA

                                      ELECTRONIC WARFARE  COMMUNITY                                   GROUP F
                                        NAVAL FLIGHT OFFICERS                                         05/20/83
                                                                                                      15:16
*********************************************************************************************************************

      RETENTION             45 %                                      NUMBER OF SQUADRONS            9
                                                                     AIRCRAFT PER SQUADRON           4
      PLOWBACK FRACTION      5 %                                     CREW FACTOR                     1.50
                                                                     NAVAL FLIGHT OFFICERS PER CREW  3.00

*********************************************************************************************************************

                                                 COMMUNITY POPULATION

      ACCESSIONS TO TRAINING (137X)       74       SENIOR COMMANDERS      39
                                                   COMMANDERS             59          COMMAND OPPORTUNITY        .53
      ACCESSIONS TO 132X DESIGNATOR       42       LT. COMMANDERS         83          DEPT HEAD OPPORTUNITY     1.00
      FIRST TOUR LENGTH                   47       LIEUTENANTS           275

                                                        TOTALS           456

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                    DISTRIBUTION BY GRADE AND ACTIVITY

         ACTIVITY                          GRADE
                                   LT      LCDR     CDR    SEN CDR  TOTAL                  ACIP PROJECTIONS
   FLEET TOURS                    181       31       8       11      231
   FLEET READINESS SQUADRON        79        0       3        1       83                 GATE  1      1.58
   TRAINING COMMAND                 5        1       0        0        6                 GATE  2      1.25
   R&D COMMUNITY                    1       10       1        0       12                 GATE  3      1.52
   AFLOAT ASSIGNMENTS               1       12       2        2       17
   PROFESSIONAL EDUCATION           2        7       5        0       14
   OTHER                            5       23      33        7       69
   NON-AVIATION ASSIGNMENTS         0        0       6       18       24        NON-AVIATION          5 %

   ==================================================================================================
   LOWER GRADE FILLS                         0       4                          HI UP DETAIL (CDR)    20%
   ==================================================================================================

*********************************************************************************************************************

                      TOTAL ANNUAL PCS MOVES THIS COMMUNITY          227

*********************************************************************************************************************

ALL REQUIREMENTS MET                          DEFAULT RUN FLT TOURS 4.5 = 30 MOS.                    ITERATIONS =  17
```

```
                                      SUMMARY DATA

                               CARRIER BASED ASW  COMMUNITY                                          GROUP I
                                 NAVAL FLIGHT OFFICERS                                               05/20/83
                                                                                                     15:17
****************************************************************************************************************

     RETENTION               45 %                              NUMBER OF SQUADRONS            6
                                                               AIRCRAFT PER SQUADRON          9
     PLOWBACK FRACTION        5 %                              CREW FACTOR                    1.44
                                                               NAVAL FLIGHT OFFICERS PER CREW 1.50

****************************************************************************************************************

                                              COMMUNITY POPULATION

     ACCESSIONS TO TRAINING (137X)      86         SENIOR COMMANDERS       44
                                                   COMMANDERS              63           COMMAND OPPORTUNITY        .51
     ACCESSIONS TO 132X DESIGNATOR      48         LT. COMMANDERS          86           DEPT HEAD OPPORTUNITY      .65
     FIRST TOUR LENGTH                  44         LIEUTENANTS            317

                                                          TOTALS          510

****************************************************************************************************************

                     DISTRIBUTION BY GRADE AND ACTIVITY

             ACTIVITY                           GRADE
                                     LT     LCDR     CDR    SEN CDR   TOTAL                  ACIP PROJECTIONS
        FLEET TOURS                 202      35        6        8      251
        FLEET READINESS SQUADRON     27       3        1        1       31                   GATE  1      1.33
        TRAINING COMMAND              8       1        0        0        9                   GATE  2      1.03
        R&D COMMUNITY                 8       4        1        0       13                   GATE  3      1.26
        AFLOAT ASSIGNMENTS            3      10        3        2       19
        PROFESSIONAL EDUCATION        9       3        4        0       16
        OTHER                        35      12       28        8       83
        NON-AVIATION ASSIGNMENTS     24      19       20       25       88           NON AVIATION       17 %

        ==================================================================================================
        LOWER GRADE FILLS                    15        5                             FLEET UP DETAIL (LCDR)   20%
        ==================================================================================================

****************************************************************************************************************

                        TOTAL ANNUAL PCS MOVES THIS COMMUNITY          251

****************************************************************************************************************

ALL REQUIREMENTS MET                     DEFAULT RUN FLT TOURS 4.5 - 30 MOS.                   ITERATIONS    [illegible]
```

```
                                        SUMMARY DATA

                              FORCE SUPPORT   JET   COMMUNITY                              GROUP F
                                  NAVAL FLIGHT OFFICERS                                    05/20/80
                                                                                           15:17
*******************************************************************************************************

     RETENTION             45 %                          NUMBER OF SQUADRONS            13
                                                        AIRCRAFT PER SQUADRON           0
     PLOWBACK FRACTION      5 %                         CREW FACTOR                     0.00
                                                        NAVAL FLIGHT OFFICERS PER CREW  0.00

*******************************************************************************************************

                                             COMMUNITY POPULATION

     ACCESSIONS TO TRAINING (137X)      16       SENIOR COMMANDERS      8
                                                 COMMANDERS            11          COMMAND OPPORTUNITY       0.00
     ACCESSIONS TO 132X DESIGNATOR       3       LT. COMMANDERS        16          DEPT HEAD OPPORTUNITY      .91
     FIRST TOUR LENGTH                  60       LIEUTENANTS           60

                                                     TOTALS            95

*******************************************************************************************************

                           DISTRIBUTION BY GRADE AND ACTIVITY

               ACTIVITY                           GRADE
                                       LT     LCDR     CDR    SEN CDR   TOTAL               ACIP PROJECTIONS
        FLEET TOURS                    52      10       4        3       70
        FLEET READINESS SQUADRON        0       0       0        0        0               GATE  1      1.59
        TRAINING COMMAND                1       0       0        0        2               GATE  2      1.32
        R&D COMMUNITY                   1       0       0        0        2               GATE  3      1.04
        AFLOAT ASSIGNMENTS              0       0       0        0        0
        PROFESSIONAL EDUCATION          1       1       0        1        3
        OTHER                           3       2       3        2       10
        NON-AVIATION ASSIGNMENTS        2       2       4        2        9          NON AVIATION        9 %

*******************************************************************************************************

                            TOTAL ANNUAL PCS MOVES THIS COMMUNITY            50

*******************************************************************************************************

ALL REQUIREMENTS MET                     DEFAULT RUN FLT TOURS 4.5 = 30 MOS.                  ITERATIONS -  17 1
```

```
                                              SUMMARY DATA

                                       EARLY WARNING  COMMUNITY                                      GROUP 1
                                        NAVAL FLIGHT OFFICERS                                        [illegible]
                                                                                                     [illegible]

*******************************************************************************************************

        RETENTION            45 %                               NUMBER OF SQUADRONS          12
                                                               AIRCRAFT PER SQUADRON          3
        PLOWBACK FRACTION     5 %                              CREW FACTOR                    1.66
                                                               NAVAL FLIGHT OFFICERS PER CREW 3.00

*******************************************************************************************************

                                               COMMUNITY POPULATION

        ACCESSIONS TO TRAINING (137X)      62     SENIOR COMMANDERS     39
                                                  COMMANDERS            52        COMMAND OPPORTUNITY      .52
        ACCESSIONS TO 132X DESIGNATOR      41     LT. COMMANDERS        71        DEPT HEAD OPPORTUNITY    .55
        FIRST TOUR LENGTH                  45     LIEUTENANTS          266

                                                       TOTALS          428

*******************************************************************************************************

                         DISTRIBUTION BY GRADE AND ACTIVITY

                   ACTIVITY                         GRADE
                                          LT      LCDR     CDR    SEN CDR  TOTAL            ACIP PROJECTIONS
            FLEET TOURS                  172       27        5       11     215
            FLEET READINESS SQUADRON      30        8        1        1      42            GATE  1     1.41
            TRAINING COMMAND               4        2        1        0       7            GATE  2     1.11
            R&D COMMUNITY                  7        3        1        0      11            GATE  3     1.35
            AFLOAT ASSIGNMENTS             8        3        3        2      16
            PROFESSIONAL EDUCATION         8        2        4        0      14
            OTHER                         29       10       25        7      71
            NON-AVIATION ASSIGNMENTS       7       15       13       18      53       NON AVIATION        12 %

            ==========================================================================================
            LOWER GRADE FILLS                      13        5                        HI UP DETAIL (LCDR)   20%
            ==========================================================================================

*******************************************************************************************************

                       TOTAL ANNUAL PCS MOVES THIS COMMUNITY          189

*******************************************************************************************************

ALL REQUIREMENTS MET                    DEFAULT RUN FLT TOURS 4,5 = 30 MOS                    ITERATIONS   [illegible]
```

```
                                              SUMMARY DATA

                                   MARITIME PATROL   COMMUNITY                                  GROUP 6
                                     NAVAL FLIGHT OFFICERS                                      05/20/83
                                                                                                15:20
*******************************************************************************************************

      RETENTION              45 %                                 NUMBER OF SQUADRONS          24
                                                                  AIRCRAFT PER SQUADRON         9
      PLOWBACK FRACTION       5 %                                 CREW FACTOR                  1.33
                                                                  NAVAL FLIGHT OFFICERS PER CREW  2.00

*******************************************************************************************************

                                             COMMUNITY POPULATION

      ACCESSIONS TO TRAINING (137X)     206     SENIOR COMMANDERS    128
                                                COMMANDERS           169          COMMAND OPPORTUNITY      .46
      ACCESSIONS TO 132X DESIGNATOR     144     LT. COMMANDERS       244          DEPT HEAD OPPORTUNITY    .55
      FIRST TOUR LENGTH                  44     LIEUTENANTS          946

                                                    TOTALS          1487

*******************************************************************************************************

                    DISTRIBUTION BY GRADE AND ACTIVITY

             ACTIVITY                              GRADE
                                        LT     LCDR     CDR    SEN CDR   TOTAL          ACIP PROJECTIONS
        FLEET TOURS                    601      94        5       26      727
        FLEET READINESS SQUADRON        60       4        1        2       66          GATE  1      1.27
        TRAINING COMMAND                15       1        1        0       17          GATE  2       .99
        R&D COMMUNITY                   24       9        3        1       37          GATE  3      1.20
        AFLOAT ASSIGNMENTS               9      29        8        6       52
        PROFESSIONAL EDUCATION          28       7       10        4       49
        OTHER                           99      28       81       25      232
        NON AVIATION ASSIGNMENTS       110      70       60       66      307     NON AVIATION        21 %

        ===========================================================================================
        LOWER GRADE FILLS                       42       13                        LT UP DETAIL (LCDR)   20%
        ===========================================================================================

*******************************************************************************************************

                     TOTAL ANNUAL PCS MOVES THIS COMMUNITY          651

*******************************************************************************************************

ALL REQUIREMENTS MET                   DEFAULT RUN FLT TOURS 4.5 - 30 MOS.                  ITERATIONS = 1/2 3
```

```
                                        SUMMARY DATA

                         ELECTRONIC WARFARE    VQ  COMMUNITY                                   GROUP 6
                               NAVAL FLIGHT OFFICERS                                           05/20/81
                                                                                               15:26
****************************************************************************************************

   RETENTION              45 %                              NUMBER OF SQUADRONS          4
                                                           AIRCRAFT PER SQUADRON        0
   PLOWBACK FRACTION       5                               CREW FACTOR                  0.00
                                                           NAVAL FLIGHT OFFICERS PER CREW  0.00

****************************************************************************************************

                                          COMMUNITY POPULATION

   ACCESSIONS TO TRAINING (132X)      54       SENIOR COMMANDERS       32
                                               COMMANDERS              41        COMMAND OPPORTUNITY       .21
   ACCESSIONS TO 132X DESIGNATOR      38       LT. COMMANDERS          63        DEPT HEAD OPPORTUNITY     .20
   FIRST TOUR LENGTH                  47       LIEUTENANTS            246

                                                    TOTALS            382

****************************************************************************************************

                    DISTRIBUTION BY GRADE AND ACTIVITY

        ACTIVITY                            GRADE
                                  LT     LCDR     CDR    SEN CDR   TOTAL            ACIP PROJECTIONS
     FLEET TOURS                 165      11        2       3       180
     FLEET READINESS SQUADRON      0       0        0       0         0            GATE  1     1.12
     TRAINING COMMAND              4       0        0       0         5            GATE  2      .89
     RND COMMUNITY                 8       2        1       0        11            GATE  3     1.09
     AFLOAT ASSIGNMENTS            2      11        0       2        15
     PROFESSIONAL EDUCATION        7       2        3       1        13
     OTHER                        28       7       23       9        67
     NON AVIATION ASSIGNMENTS     31      30       12      17        90       NON AVIATION        24 %

     ================================================================================================
     LOWER GRADE FILLS                     9        3                          FIT UP DELTA (LCDR)   20%
     ================================================================================================

****************************************************************************************************

                   TOTAL ANNUAL PCS MOVES THIS COMMUNITY           202

****************************************************************************************************

ALL REQUIREMENTS MET                    DEFAULT FOR FLT TOURS, 4.5    30 MOS.                 ITERATIONS    1 / 2
```

```
                                    SUMMARY DATA

                          FORCE SUPPORT  PROP  COMMUNITY
                               NAVAL FLIGHT OFFICERS                                    GROUP C
                                                                                        05/20/83
                                                                                        15:21
****************************************************************************************************

    RETENTION              45 %
                                                         NUMBER OF SQUADRONS           2
    PLOWBACK FRACTION       5 %                          AIRCRAFT PER SQUADRON         0
                                                         CREW FACTOR                   0.00
                                                         NAVAL FLIGHT OFFICERS PER CREW  0.00
****************************************************************************************************

                                          COMMUNITY POPULATION

    ACCESSIONS TO TRAINING (132X)      7       SENIOR COMMANDERS     6
                                               COMMANDERS            6     COMMAND OPPORTUNITY      0.00
    ACCESSIONS TO 132X DESIGNATOR      5       LT. COMMANDERS        9     DEPT HEAD OPPORTUNITY     .24
    FIRST TOUR LENGTH                 64       LIEUTENANTS          31

                                                  TOTALS            52
****************************************************************************************************

                        DISTRIBUTION BY GRADE AND ACTIVITY

               ACTIVITY                      GRADE
                                    LT    LCDR    CDR   SEN CDR  TOTAL          ACIP PROJECTIONS
      FLEET TOURS                   26      5      2       1      33
      FLEET READINESS SQUADRON       0      0      0       0       0          GATE  1     1.56
      TRAINING COMMAND               0      0      0       0       1          GATE  2     1.22
      R&D COMMUNITY                  1      1      0       0       2          GATE  3     1.49
      AFLOAT ASSIGNMENTS             0      1      0       0       1
      PROFESSIONAL EDUCATION         1      0      0       0       2
      OTHER                          3      2      4       2      10
      NON AVIATION ASSIGNMENTS       0      0      0       3       3       NON AVIATION         6 %
****************************************************************************************************

                        TOTAL ANNUAL PCS MOVES THIS COMMUNITY           24

****************************************************************************************************

ALL REQUIREMENTS MET                  DEFAULT RUN FLT TOURS 4.5 = 30 MOS.          ITERATIONS =  17 0
```

```
                    MULTIPLE RUN SUMMARY                                   05/20/83
                                                                           15:21

                      NAVAL AVIATORS

****************************************************************************************

                        DISTRIBUTION BY GRADE AND ACTIVITY

        ACTIVITY                                GRADE
                                     LT      LCDR     CDR     TOTAL
   FLEET TOURS                      3945      809     361      5115
   FLEET READINESS SQUADRON          673       59      59       791
   TRAINING COMMAND                  689       73      39       801
   R&D COMMUNITY                     195      109      69       373
   AFLOAT ASSIGNMENTS                137      147     265       549
   PROFESSIONAL EDUCATION            186       59     102       347
   OTHER                             530      256    1075      1861
   NON AVIATION ASSIGNMENTS          475      222   __308     __1005

   TOTALS                           6826     1838    2338     11002

****************************************************************************************

   TOTAL ANNUAL PCS MOVES                                       4850

****************************************************************************************

                      ACCESSION REQUIREMENTS BY TRAINING PIPELINE

                                     TO TRAINING      TO DESIGNATOR (PTR)
   STRIKE                                582                 414
   MARITIME PATROL                       386                 299
   HELICOPTER                          __440               __327

   TOTALS                               1408                1040

****************************************************************************************
                                          DEFAULT RUN FLT TOURS 4.5 - 30 MOS.
```

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APPENDIX B

PROGRAM LISTING

This appendix provides the program and subroutine listing. After each listing is the basic cross-reference for variables, arrays, and labels.

```
10 ************************************************************
20 *                                                          *
30 *           AVIATION OFFICER REQUIREMENTS MODEL            *
40 *                       VERSION 7.1                        *
50 *                                                          *
60 *                                                          *
70 * MULTIPLE RUNS                   (OKIE15 LINKED TO OKIE11)*
80 ************************************************************
90 /*
100
110                    MODEL DESCRIPTION
120
130      THE AVIATION OFFICER REQUIREMENTS MODEL IS A STEADY STATE,
140 DETERMINISTIC, SIMULATION OF THE OFFICER CAREER PATH FLOWS FOR
150 THE AVIATION OFFICER COMMUNITY OF THE NAVY.  THE SET OF ALL
160 AVIATION OFFICER BILLETS (131X/132X) IS PARTITIONED INTO TWENTY
170 THREE SUBCOMMUNITIES (E.G. FIGHTER AVIATOR, MARITIME PATROL ETC).
180 A CAREER PATH NETWORK IS SPECIFIED FOR EACH SUBCOMMUNITY WHICH
190 CLASSIFIES SUBCOMMUNITY REQUIREMENTS IN TERMS OF TOUR NUMBER AND
200 ACTIVITY.  ACTIVITIES ARE DESCRIPTIVE CATEGORIES WHICH BROADLY
210 CHARACTERIZE THE DUTIES TO WHICH AVIATION OFFICERS ARE ASSIGNED.
220 THUS A SET OF 49 ACTIVITY/TOUR NUMBER STATES ARE CREATED FOR EACH
230 SUBCOMMUNITY.  IN ADDITION, THE MODEL SPECIFIES TRANSITION RULES
240 BY WHICH THE MOVEMENT OF OFFICERS BETWEEN STATES ARE GOVERNED.
250
260      THE MODEL IS WRITTEN IN WANG VS BASIC FOR THE WANG 2200VS
270 COMPUTER.  HOWEVER, THE MODEL IS 'USER FRIENDLY' IN THAT, HAVING
280 LOGGED ON AT A TERMINAL AND CALLED THE PROGRAM LISTED BELOW, THE
290 REMAINDER OF THE SESSION IS INTERACTIVELY CUED TO LEAD THE USER
300 THROUGH SELECTION OF RUN ALTERNATIVES, SETTING OF MODEL PARAMETERS
310 AND SELECTION OF OUTPUTS.  THE USER CAN ALTER ANY (OR ALL) OF 29
320 MODEL PARAMETERS FOR A GIVEN SUBCOMMUNITY RUN.  THE MODEL IS PRE-
330 LOADED WITH DEFAULT VALUES FOR ALL PARAMETERS.  THESE REPRESENT
340 CURRENT NAVY PRACTICE.  IF THE USER DOES NOT CHANGE A PARAMETER
350 DURING SET UP, THE DEFAULT VALUE IS USED.  THE USER ALSO HAS THE
360 OPTION OF MAKING SINGLE SUBCOMMUNITY RUNS OR MULTIPLE RUNS COVER-
370 ING ANY NUMBER OF SUBCOMMUNITIES IN A SINGLE SET UP.
380
390      THE PROGRAM LISTING HAS BEEN BROKEN DOWN INTO SEGMENTS WHICH
400 PRESENT THE MAJOR FUNCTIONS PERFORMED IN LOGICAL SEQUENCE.
410
420        SECTION                 CONTENTS
430
440           I        DEFAULT DATA AND PROGRAM INITIALIZATION
450          II        INTERACTIVE ENTRY/REENTRY ROUTINES
460         III        MULTIPLE RUN SET UP ROUTINES
470          IV        REQUIREMENTS COMPUTATION
480           V        NETWORK SOLUTION ROUTINES
490          VI        ITERATION CHECK ROUTINES
500         VII        SUBROUTINES
510
520   NOTE: OUTPUT LISTINGS ARE GENERATED IN AN EXTERNAL SUBROUTINE
530         CALLED 'OFFPRIN' WHICH IS NOT PART OF THIS LISTING.      */
```

SECTION I: DEFAULT DATA AND INITIALIZATION

```
 550 COM D0(7,4),INVT(9,31),A$22,P5,P6,LABEL$(9)25,TYPE$(14)30,Q11,T$5
 560 COM D$8,D8(8),S1(15,5),P0(10),R02,D3(4),I4(7,7),T5(20),T8(20),T11
 570 COM P1$(9)130,X4$130,X5$130,B$70,C$70,T15(20),Q7(7,7),TC0(7,5),P9
 580 COM A1(15,9),E$130,T9$(7,7)26,Z1$3,Z4$3,Q37(8,4),OUTA(8),R0(30)
 590 COM X$70,PRO4,PRO5,ACC1,MGROUP$30,TOT(8,3),TOTA(8,3),TOTN(8,3)
 600 COM PTR(14),TRA$(7)25,Q76,Q85(5),Q89(5),Q75(5),Q73(5),Q74
 610 DIM N0(7),T7(20),G0(15,13),OTH(3,8),INVTO(31),T6(20),I41(7,7)
 620 DIM AUX(15,6),Q4(7,4),Q38(7),POSIT$(5)64,T10$(7,7)20,T22(50)
 630 DIM T17(20),T18(50),A50(7),T11$(15)20,Z2$3,Z3$3,T19(7),T21(7)
 640 DIM N9$(7,7)1,G4$7,ROUTE$7,G5$1,P2$(10)30,I40(7,7),PRO2$65,FA1(5)
 650 DIM GROUP$30,TGROUP$30,BGROUP$30,COM$60,R2(7,7)
 660 DIM I42(7,7),M$2,I$2,EM$40,COM1$30
 670 ****************************************************************
 680 *                                                              *
 690 *          THIS FIRST SECTION OF THE PROGRAM DEFINES           *
 700 *          AND LOADS THE BASIC MATRICES R0,G0,S1,A1            *
 710 *          TC0 AND T9$                                         *
 720 *                                                              *
 730 ****************************************************************
 740 REM CONTINUATION MATRIX
 750 JMP106:DATA 5,2,4,8,1,6,4                                /*STRUCTURE*/
 760 DATA .986,.676,.924,.980,.292,.652,0                     /*VALUES*/
 770 REM GRADE MATRIX G0
 780 REM SQ PILOT/NFO;FRS PILOT/NFO O5,O4,O3
 790 DATA 2,4,11,0,0,0,8,23,85,0,0,0,24                       /*VAL*/
 800 DATA 1,2,11,1,2,11,8,23,137,4,15,77,24                   /*VF */
 810 DATA 1,2,13,1,2,13,2,5,44,2,6,31,12                      /*VAM*/
 820 DATA 1,2,7,1,2,12,2,6,34,2,5,33,12                       /*VAW*/
 830 DATA 1,2,3,1,3,14,1,3,38,1,3,76,9                        /*VAQ*/
 840 DATA 1,3,16,1,3,15,1,8,47,1,5,24,11                      /*VS */
 850 DATA 2,4,14,0,0,0,4,17,57,0,0,0,11                       /*HS*/
 860 DATA 1,3,34,1,3,19,2,15,70,2,9,53,24                     /*VP*/
 870 DATA 2,4,14,0,0,0,4,17,51,0,0,0,6                        /*HSL1*/
 880 DATA 2,17,41,0,0,0,2,13,39,0,0,0,8                       /*HSL2*/
 890 DATA 0,0,0,0,0,0,0,0,0,0,0,0,4                           /*VQ  */
 900 DATA 0,0,0,0,0,0,0,0,0,0,0,0,13                          /*FS1 */
 910 DATA 0,0,0,0,0,0,0,0,0,0,0,0,2                           /*FSP */
 920 DATA 0,0,0,0,0,0,0,0,0,0,0,0,8                           /*FSH */
 930 DATA 1,3,1,0,0,0,0,0,0,0,0,0,12                          /*WING*/
 940 REM SQUADRON MATRIX S1
 950 REM NO SQ, A/C /SQ, CREW FACT,PILOT/CREW, NFO/CREW
 960 DATA 24,12,1.42,1,0                                      /*VAL */
 970 DATA 24,12,1.17,1,1                                      /*VF */
 980 DATA 12,14,1.14,1,1                                      /*VAM*/
 990 DATA 12,3,1.66,2,3                                       /*VAW*/
1000 DATA 9,4,1.5,1,3                                         /*VAQ*/
1010 DATA 11,9,1.44,1.5,1.5                                   /*VS */
1020 DATA 11,6,1.66,2,0                                       /*HS */
1030 DATA 24,9,1.33,3,2                                       /*VP */
```

SECTION I: DEFAULT DATA AND INITIALIZATION

```
1040 DATA 6,11,2,2,0                                              /*HSL1*/
1050 DATA 8,15,2,2,0                                              /*HSL2*/
1060 DATA 4,0,0,0,0                                               /*VQ  */
1070 DATA 13,0,0,0,0                                               /*FSJ */
1080 DATA 2,0,0,0,0                                               /*FSP */
1090 DATA 8,0,0,0,0                                               /*FSH */
1100 DATA 12,0,0,0,0                                              /*WING*/
1110 REM ALLOCATION MATRIX A1
1120 REM PILOT PIPE,NFO PIPE, PILOTS-ALL,COMMUNITY,CV;NFO - ALL,
1130 COMMUNITY,CV, ALL.
1140 DATA 1,0,.1068,.2690,.2690,0,0,0,.0723                       /*VAL*/
1150 DATA 1,4,.0838,.2110,.2110,.1797,1.0,.3101,.1142              /*VF */
1160 DATA 1,5,.0475,.1195,.1195,.1011,.3163,.1744,.0645           /*VAM*/
1170 DATA 2,6,.0311,.1045,.0783,.0929,1,.1604,.0507               /*VAW*/
1180 DATA 1,5,.0197,.0496,.0496,.0965,.3013,.1665,.0441           /*VAO*/
1190 DATA 1,5,.0508,.1279,.1279,.1092,.3419,.1885,.0694           /*VS */
1200 DATA 3,0,.0575,.1883,.1447,0,0,0,.0392                       /*HS */
1210 DATA 2,7,.2210,.7424,0,.3047,.7472,0,.2478                   /*VP */
1220 DATA 3,0,.0628,.2058,0,0,0,0,.0429                           /*HSL1*/
1230 DATA 3,0,.1141,.3739,0,0,0,0,.0779                           /*HSL2*/
1240 DATA 2,7,.0337,.1132,0,.0883,.2165,0,.0510                   /*VQ */
1250 DATA 1,5,.0886,.2230,0,.0128,.0393,0,.0685                   /*FSJ*/
1260 DATA 2,7,.0119,.0393,0,.0148,.0363,0,.0128                   /*FSP*/
1270 DATA 3,0,.0708,.2319,0,0,0,0,.0483                           /*FSH*/
1280 DATA 1,1,.3972,0,1.0,.5794,0,1.0,.4550                       /*WING*/
1290 REM AUXILLIARY MATRIX AUX
1300 REM PILOT/NFO TOTALS - O5,O4,O3
1310 DATA 0,12,18,0,0,0                                           /*AUX VA*/
1320 DATA 0,6,6,0,4,8                                             /*AUX VF*/
1330 DATA 0,4,0,0,2,0                                             /*AUX VAM*/
1340 DATA 0,2,2,0,2,0                                             /*AUX VAW*/
1350 DATA 2,4,21,1,5,29                                           /*AUX VAO*/
1360 DATA 0,0,0,0,0,0                                             /*AUX VS*/
1370 DATA 2,10,4,0,0,0                                            /*AUX HS*/
1380 DATA 0,56,6,0,17,27                                          /*AUX VP*/
1390 DATA 0,6,0,0,0,0                                             /*AUX HSL1*/
1400 DATA 0,0,0,0,0,0                                             /*AUX HSL2*/
1410 DATA 4,20,117,3,12,140                                       /*AUX VQ */
1420 DATA 25,96,247,6,10,47                                       /*AUX FSJ*/
1430 DATA 2,10,38,2,4,23                                          /*AUX FSP*/
1440 DATA 16,65,276,0,0,0                                         /*AUX FSH*/
1450 DATA 0,0,0,0,0,0                                             /*AUX WING*/
1460 REM TRAINING COMMAND MATRIX TCO
1470 REM J,P,H,RIO,TN,ATDS,NAV.
1480 REM I/O RATIO, O5, O4, IP, INFO
1490 DATA 1.405,22,44,.860,0                                      /*JET*/
1500 DATA 1.291,7,14,.443,0                                       /*PROP*/
1510 DATA 1.347,7,14,.542,0                                       /*HELO*/
1520 DATA 1.791,1,2,.180,.255                                     /*RIO */
1530 DATA 1.771,1,2,.118,.156                                     /*TN  */
```

SECTION I: DEFAULT DATA AND INITIALIZATION

```
1540 DATA 1.523,1,2,.070,.079                                   /*ATDS*/
1550 DATA 1.426,1,2,.030,.088                                   /*NAV */
1560 REM POLICY VECTOR
1570 REM PLOWBACK,PG,WARCOLLEGE,O4,O4+,O5,O6,DOP4,DOP5,DOP6
1580 DATA .05,.30,.50,.85,.20,.70,.60,1,1,1
1590 REM R&D, AFLOAT, OTHER (OTH MATRIX)
1600 REM O5+,O5,O4,O3-
1610 DATA 24,28,120,189,5,6,31,75                               /*R&D*/
1620 DATA 88,105,130,219,14,9,60,82                             /*AFLOAT*/
1630 DATA 263,315,710,634,91,91,243,312                         /*OTHER*/
1640 DATA"FLEET TOURS"
1650 DATA"FLEET READINESS SQUADRON"
1660 DATA"TRAINING COMMAND"
1670 DATA"R&D COMMUNITY"
1680 DATA"AFLOAT ASSIGNMENTS"
1690 DATA"PROFESSIONAL EDUCATION"
1700 DATA"OTHER"
1710 DATA"UNASSIGNED"
1720 DATA"NON-AVIATION ASSIGNMENTS"
1730 DATA"LIGHT ATTACK"
1740 DATA"FIGHTER"
1750 DATA"MEDIUM ATTACK"
1760 DATA"EARLY WARNING"
1770 DATA"ELECTRONIC WARFARE"
1780 DATA"CARRIER BASED ASW"
1790 DATA"HELICOPTER ASW"
1800 DATA"MARITIME PATROL"
1810 DATA"LAMPS MK I"
1820 DATA"LAMPS MK III"
1830 DATA"ELECTRONIC WARFARE - VQ"
1840 DATA"FORCE SUPPORT - JET"
1850 DATA"FORCE SUPPORT - PROP"
1860 DATA"FORCE SUPPORT - HELO"
1870 DATA"STRIKE"
1880 DATA"MARITIME PATROL"
1890 DATA"HELICOPTER"
1900 DATA"RADAR INTERCEPT OFFICER"
1910 DATA"TACTICAL NAVIGATOR"
1920 DATA"ATDS"
1930 DATA"NAVIGATOR"
1940 DATA"FIRST FLEET ITERATION COMPLETE"
1950 DATA"FIRST TOUR FILL-UP COMPLETE"
1960 DATA"CATEGORY SEARCH COMPLETE"
1970 DATA"NFEA'S CREATED"
1980 DATA"FIRST TOUR LENGTH ADJUSTED"
1990 REM LOAD T9$ WITH TOUR LENGTH AND BARRED TOURS
2000 DATA"36OOONNNNNNNNNNNNNNNNNNOOO"                            /*FLEET 1*/
2010 DATA"36NNNNNNOOONNNNNNNNNNNNOOO"                            /*FLEET 2*/
2020 DATA"36NNNOOOOOOOOONNNOOOOOOOOO"                            /*FLEET 3*/
2030 DATA"36NNNOOOOOOOOOOOOOOOOOOOOO"                            /*FLEET 4*/
```

SECTION I: DEFAULT DATA AND INITIALIZATION

```
2040 DATA"36NNN0000000000000000000000"                    /*FLEET 5*/
2050 DATA"240000000000000000000000000"                    /*FLEET 6*/
2060 DATA"120000000000000000000000000"                    /*FLEET 7*/
2070 DATA"36NNNNNNNNNNNNNNNNNNNNNN000"                    /*FRS 1   */
2080 DATA"36000NNNNNNNNNNNNNNNNNNN000"                    /*FRS 2   */
2090 DATA"36000NNNNNNNNNNNNNNNNNNN000"                    /*FRS 3   */
2100 DATA"36000NNNNNNNNNNNNNNNNNNN000"                    /*FRS 4   */
2110 DATA"36000NNNNNNNNNNNNNNNNNNN000"                    /*FRS 5   */
2120 DATA"24000NNNNNNN000000000000000"                    /*FRS 6   */
2130 DATA"24000NNNNNNNNNNNNNNNNNNN000"                    /*FRS 7   */
2140 DATA"24000NNNNNNNNNNNNNNNNNNN000"                    /*TRAC 1 */
2150 DATA"36000NNNNNNNNNNNNNNNNNNN000"                    /*TRAC 2 */
2160 DATA"36NNNNNNNNNNNNNNN0000000000"                    /*TRAC 3 */
2170 DATA"36000NNNNNNNNNN000000000000"                    /*TRAC 4 */
2180 DATA"36000NNNNNNNNN0000000000000"                    /*TRAC 5 */
2190 DATA"240000000000000000000000000"                    /*TRAC 6 */
2200 DATA"36NNNNNN0000000000000000000"                    /*TRAC 7 */
2210 DATA"36NNNNNNNNNNNNNNNNNNNNNN000"                    /*RD 1    */
2220 DATA"36000NNNNNNNNNNNNNNNNNNN000"                    /*RD 2    */
2230 DATA"36000000000NNNNNNN00NNNN000"                    /*RD 3    */
2240 DATA"36000000NNNNNN0000000000000"                    /*RD 4    */
2250 DATA"36000000000NNN0000000000000"                    /*RD 5    */
2260 DATA"36000000000NNN0000000000000"                    /*RD 6    */
2270 DATA"36000000000NNN0000000000000"                    /*RD 7    */
2280 DATA"24NNNNNNNNNNNNNNNNNNNNNN000"                    /*AFLT 1 */
2290 DATA"24NNNNNNNNNNNNNNNNNNNNNN000"                    /*AFLT 2 */
2300 DATA"24NNN00000000NNN00000000000"                    /*AFLT 3 */
2310 DATA"24NNN00000000NNN00000000000"                    /*AFLT 4 */
2320 DATA"24NNN00000000NNN00000000000"                    /*AFLT 5 */
2330 DATA"24NNN00000000NNN00000000000"                    /*AFLT 6 */
2340 DATA"2400000000000NNN00000000000"                    /*AFLT 7 */
2350 DATA"24NNNNNNNNNNNNNNNNNNNNNN000"                    /*PROF 1 */
2360 DATA"24000NNNNNNNNNNNNNNNNNNN000"                    /*PROF 2 */
2370 DATA"2400000000000NNNNNN00000000"                    /*PROF 3 */
2380 DATA"240000NNN000000NNN000000000"                    /*PROF 4 */
2390 DATA"120000000000000NNN000000000"                    /*PROF 5 */
2400 DATA"120000000000000NNN000000000"                    /*PROF 6 */
2410 DATA"120000000000000NNN000000000"                    /*PROF 7 */
2420 DATA"36NNNNNNNNNNNNNNNNNNNNNN000"                    /*OTH 1   */
2430 DATA"36000NNNNNNNNNNNNNNNNNNN000"                    /*OTH 2   */
2440 DATA"360000000000000NNNNNNNNN000"                    /*OTH 3   */
2450 DATA"360000000000000NNNNNNNNN000"                    /*OTH 4   */
2460 DATA"360000000000000000000000000"                    /*OTH 5   */
2470 DATA"360000000000000000000000000"                    /*OTH 6   */
2480 DATA"360000000000000000000000000"                    /*OTH 7   */
2490 DATA .2,.1,.5,.1,.1
2500 SELECT #1,"TEMP01",INDEXED,RECSIZE=158,KEYPOS=1,KEYLEN=2
2510 FILEFORM:FMT POS(1),CH(2),POS(3),PIC(##),POS(5),PIC(##),POS(7),
2520 PIC(##),POS(9),CH(3),POS(12),CH(3),POS(15),CH(3),POS(18),CH(22),
2530 POS(40),CH(30),POS(70),PIC(##),POS(72),PIC(##),POS(74),PIC(#.##),
```

SECTION I: DEFAULT DATA AND INITIALIZATION

```
2540 POS(78),PIC(#.#),POS(81),PIC(##),POS(83),PIC(##),POS(85),PIC(##), !
2550 POS(87),PIC(##),POS(89),PIC(##),POS(91),PIC(##),POS(93),PIC(##),  !
2560 POS(95),PIC(###),POS(98),PIC(##),POS(100),PIC(##),POS(102),       !
2570 PIC(#.###),POS(107),PIC(#.###),POS(112),PIC(#.##),POS(116),       !
2580 PIC(#.##),POS(120),PIC(#.##),POS(124),PIC(#.####),POS(130),       !
2590 PIC(#.####),POS(136),PIC(#.####),POS(142),PIC(#.####),POS(148),   !
2600 PIC(#),POS(149),PIC(#.##),POS(153),PIC(##),POS(155),PIC(##),      !
2610 POS(157),PIC(##)
2620 SELECT #2,"TEMPD2",VAR,INDEXED,RECSIZE=400,KEYPOS=1,KEYLEN=2
2630 FILECAR:FMT POS(1),CH(2),POS(3),PIC(##),POS(5),15*CH(26),         !
2640      POS(395),PIC(###),POS(398),PIC(###)
2650 OPEN NODISPLAY #1,OUTPUT,SPACE=30,FILE="SOURCE",LIBRARY="OFFREQ", !
2660 VOLUME="VOL555"
2670 CLOSE #1
2680 OPEN NODISPLAY #2,OUTPUT,SPACE=30,FILE="CAREER",LIBRARY="OFFREQ", !
2690 VOLUME="VOL555"
2700 CLOSE #2
2710 JMP105:RESTORE LINE = JMP106
2720 REM LOAD CONTINUATION VECTOR
2730 FOR I = 1 TO 7
2740 READ NO(I)
2750 NEXT I
2760 FOR I = 1 TO 7
2770 READ A50(I)
2780 NEXT I
2790 B32 = 1
2800 FOR I = 1 TO 7
2810 FOR J = B32 TO B32 + NO(I) - 1
2820 RO(J) = A50(I)
2830 NEXT J
2840 B32 = B32 + NO(I)
2850 NEXT I
2860 RO1 = 1
2870 RO2 = .45
2880 RO3 = 5
2890 RO4 = 7
2900 RO5 = 11
2910 INIT(HEX(20))STR(PRO2$,12,53)
2920 PRO4=102:PRO5=162:PRO3=23:PRO6=38
2930 STR(PRO2$,23,1)=HEX(5E):STR(PRO2$,38,1)=HEX(5E)
2940 STR(PRO2$,5,1)=HEX(5E)
2950 REM LOAD GRADE MATRIX GO
2960 FOR I = 1 TO 15
2970 FOR J = 1 TO 13
2980 READ GO(I,J)
2990 NEXT J
3000 NEXT I
3010 REM LOAD SQUADRON MATRIX S1
3020 FOR I = 1 TO 15
3030 FOR J = 1 TO 5
```

SECTION I: DEFAULT DATA AND INITIALIZATION

```
3040 READ S1(I,J)
3050 NEXT J
3060 NEXT I
3070 REM LOAD ALLOCATION MATRIX A1
3080 FOR I = 1 TO 15
3090 FOR J = 1 TO 9
3100 READ A1(I,J)
3110 NEXT J
3120 NEXT I
3130 REM LOAD AUX MATRIX
3140 FOR I = 1 TO 15
3150 FOR J = 1 TO 6
3160 READ AUX(I,J)
3170 NEXT J
3180 NEXT I
3190 REM LOAD TRACOM MATRIX
3200 FOR I = 1 TO 7
3210 FOR J = 1 TO 5
3220 READ TCO(I,J)
3230 NEXT J
3240 NEXT I
3250 REM LOAD POLICY VECTOR PO
3260 FOR I = 1 TO 10
3270 READ PO(I)
3280 NEXT I
3290 REM LOAD OTH
3300 FOR I = 1 TO 3
3310 FOR J = 1 TO 8
3320 READ OTH (I,J)
3330 NEXT J
3340 NEXT I
3350 FOR I = 1 TO 9
3360 READ LABEL$(I)
3370 NEXT I
3380 FOR K = 1 TO 14
3390 READ TYPE$(K)
3400 NEXT K
3410 FOR K = 1 TO 7
3420 READ TRA$(K)
3430 NEXT K
3440 FOR K = 1 TO 5
3450 READ POSIT$(K)
3460 NEXT K
3470 M = 1:Q11 = 1
3480 A$ = "NAVAL AVIATORS"
3490 Z1$ = "YES":Z3$ = "YES":Z4$ = "NO"
3500 REM LOAD T9$
3510 FOR I = 1 TO 7
3520 FOR J = 1 TO 7
3530 READ T9$(I,J)
```

```
3540 T10$(I,J) = T9$(I,J)
3550 N9$(I,J) = HEX(6F)
3560 NEXT J
3570 NEXT I
3580 FOR I = 1 TO 5
3590 READ FA1(I)
3600 NEXT I
```

SECTION II: INTERACTIVE ENTRY/REENTRY ROUTINES

```
3620 *****************************************************************
3630 *                                                               *
3640 *         AT THIS POINT ALL STANDARD DATA IS LOADED.  AN        *
3650 *         INTERACTIVE ROUTINE TO ENTER CHANGES FOLLOWS.         *
3660 *                                                               *
3670 *                                                               *
3680 *****************************************************************
3690 JMP100:T50 = 1:T51 = 0:D2 = ROUND(R02*100,0):DAT=20
3700 MAT Q85=ZER:MAT Q89=ZER:MAT Q75=ZER:MAT Q79=ZER:MAT PTR=ZER:Q74=0
3710 JMP110: ACCEPT AT(2,10),"*******************************************
3720 ***********************",
3730         AT(3,10),"*",AT(3,70),"*",
3740         AT(4,10),"*",AT(4,22),"AVIATION OFFICER REQUIREMENTS MODEL
3750 ",AT(4,70),"*",
3760         AT(5,10),"*",AT(5,70),"*",
3770         AT(6,10),"****************************************************
3780 ***************",
3790          AT(8,10),"THE AVIATION OFFICER REQUIREMENTS MODEL DETERMI
3800 NES THE",
3810         AT(9,10),"NUMBER OF NAVAL AVIATORS OR NAVAL FLIGHT OFFICER
3820 S REQUIRED",
3830         AT(10,10),"IN RESPONSE TO THE SPECIFICATION OF OFFICER RET
3840 ENTION AND",
3850         AT(11,10),"A NUMBER OF FORCE LEVEL AND CAREER PLANNING PAR
3860 AMETERS",
3870         AT(13,10),"THE MODEL TREATS NAVAL AVIATORS AND NAVAL FLIGH
3880 T OFFICERS",
3890         AT(14,10),"SEPARATELY, AND BY COMMUNITY.  IT IS PRESENTLY
3900 SET TO WORK",
3910         AT(15,10),"ON",AT(15,13),FAC(HEX(94)),A$,AT(15,14+LEN(A$))
3920 ,"IN THE",AT(15,21+LEN(A$)),FAC(HEX(94)),TYPE$(Q11),
3930         AT(15,22+LEN(A$)+LEN(TYPE$(Q11))),"COMMUNITY",
3940         AT(18,10),"TO CONTINUE WORKING IN THIS COMMUNITY PRESS
3950  'ENTER'",
3960         AT(19,10),"TO BEGIN A NEW COMMUNITY OF AVIATORS  PRESS
3970    PF-1",
3980         AT(20,10),"TO BEGIN A NEW COMMUNITY OF NFO'S     PRESS
3990    PF-2",
4000         AT(21,10),"TO MAKE MULTIPLE COMMUNITY RUNS       PRESS
4010    PF-3",
4020         AT(22,10),"TO RESET MODEL TO DEFAULT VALUES      PRESS
4030    PF-15",
4040         AT(24,10),"TO END PROCESSING                     PRESS
4050    PF-16",
4060 KEYS(BIN(0)&BIN(1)&BIN(2)&BIN(3)&BIN(15)&BIN(16)),KEY(KY)
4070 IF KY = 16 THEN END
4080 IF KY = 15 THEN JMP105
4090 IF KY = 3 THEN JMP300
4100 IF KY = 2 THEN JMP140
```

```
4110 IF KY = 0 THEN JMP180
4120 /*NAVAL AVIATOR DISPLAY*/
4130 ACCEPT AT(3,22),"NAVAL AVIATOR COMMUNITY SELECTIONS",
4140          AT(5,10),"YOU MAY SELECT FROM AMONG FOURTEEN COMMUNITIES I
4150 N WHICH",
4160          AT(6,10),"NAVAL AVIATORS ARE REQUIRED.  THESE ARE LISTED B
4170 ELOW.  BY",
4180          AT(7,10),"PRESSING THE PF KEY CORRESPONDING TO THE ITEM NU
4190 MBER ON",
4200          AT(8,10),"THE LIST YOU WILL SELECT NAVAL AVIATORS IN THAT
4210 COMMUNITY",
4220          AT(9,10),"FOR ANALYSIS.",
4230          AT(11,5),"PF KEY",AT(11,14),"COMMUNITY",AT(11,45),"PF KEY"
4240 ,AT(11,54),"COMMUNITY",
4250          AT(13,8),"1",AT(13,12),"LIGHT ATTACK",AT(13,48),"8",AT(13,
4260 52),"MARITIME PATROL",
4270          AT(14,8),"2",AT(14,12),"FIGHTER",AT(14,48),"9",AT(14,52),"
4280 LAMPS MK I",
4290          AT(15,8),"3",AT(15,12),"MEDIUM ATTACK",AT(15,47),"10",
4300 AT(15,52),"LAMPS MK III",
4310          AT(16,8),"4",AT(16,12),"EARLY WARNING - VAW",AT(16,47),"11
4320 ",AT(16,52),"ELECTRONIC WARFARE - VQ",
4330          AT(17,8),"5",AT(17,12),"ELECTRONIC WARFARE - VAQ",AT(17,47
4340 ),"12",AT(17,52),"FORCE SUPPORT - JET",
4350          AT(18,8),"6",AT(18,12),"CARRIER BASED ASW",AT(18,47),"13",
4360 AT(18,52),"FORCE SUPPORT - PROP",
4370          AT(19,8),"7",AT(19,12),"HELICOPTER ASW",AT(19,47),"14",AT(
4380 19,52),"FORCE SUPPORT - HELO",
4390          AT(23,10),"TO RETURN TO BASIC MENU WITHOUT MAKING A SELECT
4400 ION  -  PRESS 'ENTER'",
4410 KEYS(BIN(0)&BIN(1)&BIN(2)&BIN(3)&BIN(4)&BIN(5)&BIN(6)&BIN(7)&BIN(
4420 8)&BIN(9)&BIN(10)&BIN(11)&BIN(12)&BIN(13)&BIN(14)),KEY(M5),
4430 ON BIN(0) GOTO JMP110
4440 IF M5 = 0 THEN JMP110
4450 M = M5
4460 Q11 = M
4470 GOTO JMP180
4480 JMP140:/*NFO COMMUNITY DISPLAY*/
4490 ACCEPT AT(3,20),"NAVAL FLIGHT OFFICER COMMUNITY SELECTIONS",
4500          AT(5,10),"YOU MAY SELECT FROM AMONG NINE COMMUNITIES IN WH
4510 ICH",
4520          AT(6,10),"NAVAL FLIGHT OFFICERS ARE REQUIRED.  THESE ARE L
4530 ISTED",
4540          AT(7,10),"BELOW.  BY PRESSING THE PF KEY CORRESPONDING TO
4550 THE",
4560          AT(8,10),"ITEM NUMBER ON THE LIST YOU WILL SELECT NFO'S IN
4570  THAT",
4580          AT(9,10),"COMMUNITY FOR ANALYSIS",
4590          AT(11,22),"PF KEY",AT(11,30),"COMMUNITY",
4600          AT(13,25),"1",AT(13,29),"FIGHTER",
4610          AT(14,25),"2",AT(14,29),"MEDIUM ATTACK",                   !
4620          AT(15,25),"3",AT(15,29),"EARLY WARNING - VAW",             !
4630          AT(16,25),"4",AT(16,29),"ELECTRONIC WARFARE - VAQ",        !
4640          AT(17,25),"5",AT(17,29),"CARRIER BASED ASW",               !
4650          AT(18,25),"6",AT(18,29),"MARITIME PATROL",                 !
4660          AT(19,25),"7",AT(19,29),"ELECTRONIC WARFARE - VQ",         !
4670          AT(20,25),"8",AT(20,29),"FORCE SUPPORT - JET",             !
4680          AT(21,25),"9",AT(21,29),"FORCE SUPPORT - PROP",            !
4690          AT(23,10),"TO RETURN TO BASIC MENU WITHOUT MAKING A SELECT!
4700 ION  -  PRESS 'ENTER'",                                              !
4710 KEYS(BIN(0)&BIN(1)&BIN(2)&BIN(3)&BIN(4)&BIN(5)&BIN(6)&BIN(7)&BIN(!
4720 8)&BIN(9)),KEY(M5),ON BIN(0) GOTO JMP110
4730 IF M5 = 0 THEN JMP110
4740 ON M5 GOTO ,,,,,JMP150,JMP160,JMP160,JMP160
4750 M = M5 + 16
4760 GOTO JMP170
4770 JMP150:M = M5 + 17
4780 GOTO JMP170
4790 JMP160:M = M5 + 19
4800 JMP170:Q11 = M - 15
4810 JMP180:IF M > 15 THEN A$ = "NAVAL FLIGHT OFFICERS"
4820 IF M < 16 THEN A$ = "NAVAL AVIATORS"
4830 IF M > 15 THEN S = 5 ELSE S = 4
4840 IF M > 15 THEN S1 = 4 ELSE S1 = 1
4850 P5 = LEN(A$)
4860 P6 = LEN(TYPE$(Q11))
4870 P7 = INT((59 - (11+P5))/2)
4880 P8 = INT((59 - (10+P6))/2)
4890 P9 = INT((79-P5-P6-25)/2)
4900 INIT(HEX(20))P1$(1)
4910 STR(P1$(1),1,10) = "WORKING ON"
4920 STR(P1$(1),12,LEN(A$)) = A$
4930 INIT(HEX(20))P1$(2)
4940 STR(P1$(2),1,LEN(TYPE$(Q11))) = TYPE$(Q11)
4950 STR(P1$(2),LEN(TYPE$(Q11))+2,9) = "COMMUNITY"
4960 IF Z4$ = "YES" AND STR(ROUTE$,1,1) <> HEX(20) THEN GOTO JMP220
4970 ACCEPT AT (4,70),FAC(HEX(94)),C4$,                                   !
4980          AT(5,10),"***********************************************!
4990 **************",AT(6,10),"*",AT(6,70),"*",                             !
5000 AT(7,10),"*",AT(7,10+P7),FAC(HEX(8C)),P1$(1),CH(33),                 !
5010 AT(7,70),"*",AT(8,10),"*",AT(8,70),"*",AT(9,10),                     !
5020 "*",AT(9,39),"IN",AT(9,70),"*",AT(10,10),"*",AT(10,70),"*",           !
5030 AT(11,10),"*",AT(11,10+P8),FAC(HEX(8C)),P1$(2),CH(33),               !
5040 AT(11,70),"*",AT(12,10),"*                                           !
5050                          *",AT(13,10),"***************************!
5060 **********************************",AT(16,10),                        !
5070 "DO YOU DESIRE IN-PROCESS MONITORING?",AT(16,55),FAC(HEX(81)),       !
5080 Z1$,CH(3),AT(16,61),"(YES/NO)",AT(18,10),"DO YOU DESIRE UPWARD DE!
5090 TAILING?",AT(18,55),FAC(HEX(81)),Z3$,CH(3),AT(18,61),"(YES/NO)",      !
5100 AT(24,10),"PRESS ENTER TO CONTINUE"
```

```
5110 IF Z4$ = "YES" THEN STR(ROUTE$,1,1) = "A"
5120 IF Z4$ = "YES" THEN GOTO JMP220
5130 JMP130:ACCEPT AT(5,10),"THE AVIATION OFFICER REQUIREMENTS MODEL I!
5140 S LOADED WITH", AT(6,10),"NOMINAL VALUES OF PARAMETERS REQUIRED T!
5150 O DETERMINE THE", AT(7,10),"REQUIREMENT FOR",AT(7,26),FAC(HEX(94)!
5160 ),A$,CH(21),AT(7,27+P5),"IN THE",AT(7,34+P5),FAC(HEX(94)),       !
5170 TYPE$(Q11),CH(23),AT(8,10),"COMMUNITY",                          !
5180 AT(10,10),"YOU CAN REVIEW AND/OR ALTER THESE PARAMETERS BY PRESSI!
5190 NG THE",AT(11,10),   "PF KEY CORRESPONDING TO THE ITEM NUMBERS IN!
5200  THE LIST OF",AT(12,10),"PARAMETER CATEGORIES GIVEN BELOW.  THIS !
5210 ACTION WILL CALL UP",AT(13,10),  "A LIST OF THE INDICATED PARAMET!
5220 ERS WITH THEIR CURRENT VALUES",                                  !
5230        AT(15,20),"PF KEY",AT(15,30),"PARAMETER CATEGORY",        !
5240        AT(16,23),"1",AT(16,28),"BASIC COMMUNITY DATA",           !
5250        AT(17,23),"2",AT(17,28),"TRAINING REQUIREMENTS DATA",     !
5260        AT(18,23),"3",AT(18,28),"POLICY VARIABLES",               !
5270        AT(19,23),"4",AT(19,28),"ALLOCATION PARAMETERS",          !
5280        AT(20,23),"5",AT(20,28),"CAREER PATH NETWORK",            !
5290        AT(23,10),"TO RETURN TO COMMUNITY SELECTION MENU PRESS 'PF!
5300 -16'",                                                           !
5310        AT(24,10),"TO CONTINUE PROGRAM WITHOUT PARAMETER REVIEW PR!
5320 ESS 'ENTER'",                                                    !
5330 KEYS(BIN(0)&BIN(1)&BIN(2)&BIN(3)&BIN(4)&BIN(5)&BIN(16)),         !
5340 ON (BIN(0)&BIN(1)&BIN(2)&BIN(3)&BIN(4)&BIN(5)&BIN(16)) GOTO      !
5350 JMP280,JMP220,JMP230,JMP240,JMP250,JMP260,JMP210
5360 JMP210:GOTO JMP110
5370 JMP220:/*BASIC DATA DISPLAY*/
5380 IF Z4$ = "YES" AND STR(ROUTE$,2,1) <> HEX(20) THEN GOTO JMP230
5390 A3$=HEX(8C):INIT(HEX(20))COM1$
5400 IF A1(Q11,5)>0 THEN A2$=HEX(8C) ELSE A2$=HEX(9C)
5410 IF A1(Q11,5)>0 THEN COM1$ = "NUMBER OF CARRIER AIR WINGS "
5420 A=D2
5430 ACCEPT AT(3,30),"BASIC COMMUNITY DATA",AT(3,70),FAC(HEX(94)),C4$,!
5440        AT(4,INT((79-(P5+P6+1))/2)),FAC(HEX(94)),TYPE$(Q11),CH(23)!
5450       ,AT(4,P6+1+INT((79-(P5+P6+1))/2)),FAC(HEX(94)),A$,CH(21),  !
5460        AT(7,28),"PARAMETER",AT(7,45),"CURRENT VALUE",            !
5470        AT(8,15),"NUMBER OF SQUADRONS",AT(8,50),S1(Q11,1),        !
5480                   PIC(##),                                       !
5490        AT(9,15),"AIRCRAFT PER SQUADRON",AT(9,50),S1(Q11,2),      !
5500                   PIC(##),                                       !
5510        AT(10,15),"CREW FACTOR",AT(10,51),S1(Q11,3),PIC(#.##),    !
5520        AT(11,15),FAC(HEX(8C)),A$,CH(21),AT(11,16+P5),"PER CREW", !
5530        AT(11,51),S1(Q11,5),PIC(#.##),                            !
5540        AT(12,10),"***********************************************!
5550 **************",                                                 !
5560        AT(13,15),"SQUADRON GRADE DISTRIBUTION",                  !
5570        AT(14,20),"COMMANDERS",AT(14,50),GO(Q11,S1),PIC(##),      !
5580        AT(15,20),"LT. COMMANDERS",AT(15,50),GO(Q11,S1+1),PIC(##),!
5590        AT(16,20),"LIEUTENANTS",AT(16,50),GO(Q11,S1+2),PIC(##),   !
5600        AT(17,10),"***********************************************!
```

SECTION II: INTERACTIVE ENTRY/REENTRY ROUTINES

```
5610 *************",
5620        AT(18,15),"UPWARD DETAIL PERCENTAGE",AT(18,50),DAT,PIC(##)
5630       ,AT(19,15);"COMMUNITY RETENTION";AT(19,50),D2,PIC(##);
5640        AT(19,53);"PER CENT",
5650        AT(20,15),FAC(A3$),COM1$,AT(20,50);FAC(A2$),S1(15,1);
5660           PIC(##);
5670        AT(22,10);"***********************************************
5680 *************";
5690        AT(23,10);FAC(HEX(8C)),COM$;
5700        AT(24,10);"PRESS ENTER TO RECORD CHANGES AND CONTINUE";
5710 KEYS(BIN(0)&BIN(10));KEY(ND)
5720 IF Z4$ = "YES" AND ND = 10 THEN STR(ROUTE$,2,1) = "A"
5730 IF S1(15,1)<>GO(15,13) THEN GOSUB' 51(1)
5740 IF A1(Q11,5)>0 AND S1(15,1)=GO(15,13) AND S1(Q11,1)<>GO(Q11,13)
5750   THEN GOSUB' 51(Q11+1)
5760 IF A1(Q11,5)=0 AND S1(Q11,1)<>GO(Q11,13) THEN GOSUB' 51(Q11+1)
5770 GO(15,13)=S1(15,1)
5780 IF Z4$ <> "YES" THEN JMP190
5790 ND = 0
5800 JMP230:/*TRAINING REQUIREMENTS DISPLAY*/
5810 IF Z4$ = "YES" AND STR(ROUTE$,3,1) <> HEX(20) THEN GOTO JMP240
5820 ACCEPT AT(5,27);"TRAINING REQUIREMENTS DATA";AT(5,70);FAC(HEX(94)
5830 ),G4$;CH(7);
5840        AT(6,INT((79-(P5+P6+1))/2));FAC(HEX(94));TYPE$(Q11);CH(23)
5850       ,AT(6,P6+1+INT((79-(P5+P6+1))/2)),FAC(HEX(94));A$,CH(21),
5860        AT(9,10);"************************************************
5870 ************";
5880        AT(10,10);"FLEET READINESS SQUADRONS (AGGREGATE REQUIREMEN
5890 TS)";
5900        AT(11,20),"COMMANDERS";AT(11,53),GO(Q11,S1+6),PIC(##),
5910        AT(12,20),"LT. COMMANDERS";AT(12,53);GO(Q11,S1+7),PIC(##),
5920        AT(13,20);"LIEUTENANTS";AT(13,53);GO(Q11,S1+8);PIC(##),
5930        AT(14,10),"***********************************************
5940 *************";
5950        AT(15,10);"UNDERGRADUATE TRAINING  -";AT(15,37);
5960                  FAC(HEX(8C));TRA$(A1(Q11,S-3)),CH(22);
5970                  AT(15,38+LEN(TRA$(A1(Q11,S-3)))),
5980                  "TRAINING PIPELINE";
5990       AT(16,20);"COMMANDERS";AT(16,53);TCO(A1(Q11,S-3),2),PIC(##)
6000 ,AT(17,20),"LT. COMMANDERS";AT(17,53),TCO(A1(Q11,S-3),3);PIC(##),
6010        AT(18,20),"INSTRUCTOR PILOTS PER GRADUATE";AT(18,54);
6020                 TCO(A1(Q11,S-3),4);PIC(#.###),
6030        AT(19,20),"INSTRUCTOR NFOS PER GRADUATE";AT(19,54),
6040                 TCO(A1(Q11,S-3),5),PIC(#.###),
6050        AT(20,10),"***********************************************
6060 *************",
6070        AT(23,10),FAC(HEX(8C)),COM$;
6080        AT(24,10);"PRESS ENTER TO RECORD CHANGES AND CONTINUE";
6090 KEYS(BIN(0)&BIN(10));KEY(ND)
6100 IF Z4$ = "YES" AND ND = 10 THEN STR(ROUTE$,3,1) = "A"
```

```
6110 IF Z4$ <> "YES" THEN GOTO JMP190
6120 ND = 0
6130 JMP240:/*POLICY VARIABLES*/
6140 IF Z4$ = "YES" AND STR(ROUTE$,4,1) <> HEX(20) THEN GOTO JMP250
6150 ACCEPT AT(2,19),"PROMOTION FLOW POINTS AND POLICY VARIABLES",      !
6160        AT(2,70),FAC(HEX(94)),G4$,CH(7),                            !
6170        AT(3,INT((78-(P5+P6+1))/2)),FAC(HEX(94)),TYPE$(Q11),CH(22)!
6180       ,AT(3,P6+1+INT((79-(P5+P6+1))/2)),FAC(HEX(94)),A$,CH(21),   !
6190        AT(4,10),"************************************************!
6200 ************",                                                     !
6210        AT(6,29),"PROMOTION FLOW POINTS",                           !
6220        AT(8,7),"COMM",                                             !
6230        AT(9,9),HEX(06),                                            !
6240        AT(10,8)," 0*1*2*3*4*5*6*7*8*9*10*11*12*13*14*15*16*17*18*!
6250 19*20*21*22*23*24",                                                !
6260        AT(11,8),FAC(HEX(8C)),STR(PRO2$,1,12),CH(12),               !
6270        AT(11,20),FAC(HEX(88)),STR(PRO2$,13,53),CH(53),             !
6280        AT(12,9),"DESIG",AT(12,PRO3+7),"4",AT(12,PRO6+7),"5",       !
6290        AT(13,10),"***********************************************!
6300 ************",                                                     !
6310        AT(15,32),"POLICY VARIABLES",                               !
6320        AT(17,10),"PLOWBACK INSTRUCTORS (FRACTION OF GRADUATES)",  !
6330        AT(17,60),PO(1),PIC(#.##),                                  !
6340        AT(18,10),"POSTGRADUATE FLOW (FRACTION OF 12 YEAR COHORT)"!
6350 ,AT(18,60),PO(2),PIC(#.##),                                        !
6360        AT(19,10),"WAR COLLEGE FLOW (FRACTION OF 18 YEAR COHORT)",!
6370                  AT(19,60),PO(3),PIC(#.##),                        !
6380        AT(21,10),"***********************************************!
6390 ************",                                                     !
6400        AT(23,10),"PRESS PF-1 TO RECORD CHANGES AND REDISPLAY",    !
6410        AT(24,10),"PRESS ENTER TO RECORD CHANGES AND CONTINUE",    !
6420 KEYS(BIN(0)&BIN(1)),KEY(PR),NOALT GOTO JMP245
6430 PRO3 = POS(PRO2$="4")
6440 PRO6 = POS(PRO2$="5")
6450 INIT(HEX(20))STR(PRO2$,13,53)
6460 STR(PRO2$,PRO3,1) = HEX(5E)
6470 STR(PRO2$,PRO6,1) = HEX(5E)
6480 IF PRO3 > 21 AND INT((PRO3-21)/3)=(PRO3-21)/3 THEN PRO4 = 9.5 +   !
6490 INT((PRO3-21)/3)
6500 IF PRO3 > 21 AND INT((PRO3-21)/3)<>(PRO3-21)/3 THEN PRO4 = 9.5 + !
6510 INT((PRO3-21)/3) + .5
6520 IF PRO3 < 22 THEN PRO4 = PRO3/2 - 1
6530 IF PRO6 > 21 AND INT((PRO6-21)/3)=(PRO6-21)/3 THEN PRO5 = 9.5 +   !
6540 INT((PRO6-21)/3)
6550 IF PRO6 > 21 AND INT((PRO6-21)/3)<>(PRO6-21)/3 THEN PRO5 = 9.5 + !
6560 INT((PRO6-21)/3) + .5
6570 IF PRO6 < 22 THEN PRO5 = PRO6/2 - 1
6580 PRO4 = 12*PRO4 - 18:PRO5 = 12*PRO5 - 18
6590 IF PR = 1 THEN JMP240
6600 JMP245:IF Z4$ = "YES" THEN STR(ROUTE$,4,1) = "A"
```

```
6610 IF Z4$ = "YES" THEN GOTO JMP250 ELSE GOTO JMP190
6620 JMP250:/*ALLOCATION PARAMETERS)*/
6630 IF Z4$ = "YES" AND STR(ROUTE$,5,1) <> HEX(20) THEN GOTO JMP260
6640 ACCEPT AT(5,30),"ALLOCATION PARAMETERS",AT(5,70),FAC(HEX(94)),G4$
6650          ,AT(6,INT((79-(P5+P6+1))/2)),FAC(HEX(94)),TYPE$(011),CH(23)
6660          ,AT(6,P6+1+INT((79-(P5+P6+1))/2)),FAC(HEX(94)),A$,CH(21),
6670           AT(12,10),"FRACTION OF ALL ",AT(12,26),FAC(HEX(8C)),A$,
6680                      CH(23),AT(12,65),A1(011,S1+2),PIC(#.####),
6690           AT(14,10),"FRACTION OF",AT(14,22),FAC(HEX(8C)),
6700           TRA$(A1(011,S-3)),CH(23),AT(14,23+LEN(TRA$(A1(011,S-3)))),
6710             FAC(HEX(8C)),A$,CH(21),AT(14,65),A1(011,S1+3),
6720                     PIC(#.####),
6730           AT(16,10),"FRACTION OF CARRIER",AT(16,30),FAC(HEX(8C)),
6740                     A$,CH(21),AT(16,65),A1(011,S1+4),PIC(#.####),
6750           AT(18,10),"FRACTION OF ALL AVIATION OFFICERS",AT(18,65),
6760                     A1(011,9),PIC(#.####),
6770           AT(21,10),"***********************************************
6780 ******************",
6790           AT(23,10),FAC(HEX(8C)),COM$,
6800           AT(24,10),"PRESS ENTER TO RECORD CHANGES AND CONTINUE",
6810 KEYS(BIN(0)&BIN(10)),KEY(ND)
6820 IF Z4$ = "YES" AND ND = 10 THEN STR(ROUTE$,5,1) = "A"
6830 IF Z4$ <> "YES" THEN JMP190
6840 ND = 0
6850 JMP260:/* NETWORK NODE DISPLAY */
6860 IF Z4$ = "YES" AND STR(ROUTE$,6,1) <> HEX(20) THEN GOTO JMP280
6870 ACCEPT AT(1,70),FAC(HEX(94)),G4$,
6880           AT(2,10),"YOU CAN INSPECT AND/OR MODIFY THE CAREER PATH NE
6890 TWORK CHARACTERISTICS",
6900           AT(3,10),"ASSOCIATED WITH ANY NODE IN THE NETWORK.  TO SEL
6910 ECT A PARTICULAR NODE",
6920           AT(4,10),"REPLACE THE 'O' IN THE DIAGRAM BELOW WITH AN 'X'
6930 .  TO BYPASS A NODE",
6940           AT(5,10),"PRESS 'TAB'.",
6950           AT(7,42),"TOUR NUMBER",
6960           AT(9,23),"ACTIVITY",AT(9,42),"1   2   3   4   5   6   7",
6970           AT(11,15),FAC(HEX(8C)),LABEL$(1),AT(11,42),FAC(HEX(88)),
6980                 N9$(1,1),AT(11,46),FAC(HEX(88)),N9$(1,2),AT(11,50),
6990                   FAC(HEX(88)),N9$(1,3),AT(11,54),FAC(HEX(88)),
7000                 N9$(1,4),AT(11,58),FAC(HEX(88)),N9$(1,5),AT(11,62),
7010                   FAC(HEX(88)),N9$(1,6),AT(11,66),FAC(HEX(88)),
7020                   N9$(1,7),
7030           AT(12,15),FAC(HEX(8C)),LABEL$(2),AT(12,42),FAC(HEX(88)),
7040                   N9$(2,1),AT(12,46),FAC(HEX(88)),N9$(2,2),
7050                   AT(12,50),FAC(HEX(88)),N9$(2,3),AT(12,54),
7060                   FAC(HEX(88)),N9$(2,4),AT(12,58),FAC(HEX(88)),
7070                   N9$(2,5),AT(12,62),FAC(HEX(88)),N9$(2,6),
7080                   AT(12,66),FAC(HEX(88)),N9$(1,7),
7090           AT(13,15),FAC(HEX(8C)),LABEL$(3),AT(13,42),FAC(HEX(88)),
7100                   N9$(3,1),AT(13,46),FAC(HEX(88)),N9$(3,2),
7110                 AT(13,50),FAC(HEX(88)),N9$(3,3),AT(13,54),         !
7120                 FAC(HEX(88)),N9$(3,4),AT(13,58),FAC(HEX(88)),      !
7130                 N9$(3,5),AT(13,62),FAC(HEX(88)),N9$(3,6),          !
7140                 AT(13,66),FAC(HEX(88)),N9$(3,7),                   !
7150        AT(14,15),FAC(HEX(8C)),LABEL$(4),AT(14,42),FAC(HEX(88)),    !
7160                 N9$(4,1),AT(14,46),FAC(HEX(88)),N9$(4,2),          !
7170                 AT(14,50),FAC(HEX(88)),N9$(4,3),AT(14,54),         !
7180                 FAC(HEX(88)),N9$(4,4),AT(14,58),FAC(HEX(88)),      !
7190                 N9$(4,5),AT(14,62),FAC(HEX(88)),N9$(4,6),          !
7200                 AT(14,66),FAC(HEX(88)),N9$(4,7),                   !
7210        AT(15,15),FAC(HEX(8C)),LABEL$(5),AT(15,42),FAC(HEX(88)),    !
7220                 N9$(5,1),AT(15,46),FAC(HEX(88)),N9$(5,2),          !
7230                 AT(15,50),FAC(HEX(88)),N9$(5,3),AT(15,54),         !
7240                 FAC(HEX(88)),N9$(5,4),AT(15,58),FAC(HEX(88)),      !
7250                 N9$(5,5),AT(15,62),FAC(HEX(88)),N9$(5,6),          !
7260                 AT(15,66),FAC(HEX(88)),N9$(5,7),                   !
7270        AT(16,15),FAC(HEX(8C)),LABEL$(6),AT(16,42),FAC(HEX(88)),    !
7280                 N9$(6,1),AT(16,46),FAC(HEX(88)),N9$(6,2),          !
7290                 AT(16,50),FAC(HEX(88)),N9$(6,3),AT(16,54),         !
7300                 FAC(HEX(88)),N9$(6,4),AT(16,58),FAC(HEX(88)),      !
7310                 N9$(6,5),AT(16,62),FAC(HEX(88)),N9$(6,6),          !
7320                 AT(16,66),FAC(HEX(88)),N9$(5,7),                   !
7330        AT(17,15),FAC(HEX(8C)),LABEL$(7),AT(17,42),FAC(HEX(88)),    !
7340                 N9$(7,1),AT(17,46),FAC(HEX(88)),N9$(7,2),          !
7350                 AT(17,50),FAC(HEX(88)),N9$(7,3),AT(17,54),         !
7360                 FAC(HEX(88)),N9$(7,4),AT(17,58),FAC(HEX(88)),      !
7370                 N9$(7,5),AT(17,62),FAC(HEX(88)),N9$(7,6),          !
7380                 AT(17,66),FAC(HEX(88)),N9$(7,7),                   !
7390                 AT(23,10),"TO BEGIN NODE INSPECTION/MODIFICATION !
7400 PRESS       'ENTER'",                                              !
7410                 AT(24,10),"TO RETURN TO CATEGORY MENU PRESS        !
7420             'PF-1'",                                               !
7430 KEYS(HEX(0001)),ON(BIN(1)) GOTO JMP130
7440 FOR I = 1 TO 7
7450 FOR J = 1 TO 7
7460 IF N9$(I,J) = HEX(6F) THEN JMP270
7470 ACCEPT AT(1,30),"NODE CHARACTERISTICS",AT(1,70),FAC(HEX(84)),G4$, !
7480        AT(3,10),"NODE CHARACTERISTICS ARE REFERRED TO THE OUTPUT !
7490 END OF THE ARC",                                                   !
7500        AT(4,10),"IN QUESTION.  THAT NODE IDENTIFIES THE ACTIVITY !
7510 IN WHICH THE",                                                     !
7520        AT(5,10),"OFFICER IS ENGAGED.  THE ACTIVITY AND TOUR NUMBE!
7530 R CURRENTLY",                                                      !
7540        AT(6,10),"BEING EXAMINED IS:",                              !
7550        AT(8,15),FAC(HEX(8C)),LABEL$(I),AT(8,42),"TOUR NUMBER",     !
7560        AT(8,55),FAC(HEX(8C)),J,PIC(#),                             !
7570        AT(10,10),"FOR TOURS TERMINATING AT THAT NODE",             !
7580        AT(11,10),"THE FOLLOWING VALUES APPLY:",                    !
7590        AT(13,34),"TOUR LENGTH",AT(13,50),FAC(HEX(88)),STR(T9$(I,J!
7600 ),1,2),                                                            !
```

```
7610        AT(15,10),"PRECEDENT NODE         STATE",AT(15,50),"PRECEDE!
7620 NT NODE        STATE",                                           !
7630        AT(16,5),FAC(HEX(8C)),LABEL$(1),AT(16,33),FAC(HEX(89)),   !
7640                 STR(T9$(I,J),3,3),AT(16,45),FAC(HEX(8C)),LABEL$(2!
7650 ),AT(16,73),FAC(HEX(89)),STR(T9$(I,J),6,3),                      !
7660        AT(17,5),FAC(HEX(8C)),LABEL$(3),AT(17,33),FAC(HEX(89)),   !
7670                 STR(T9$(I,J),9,3),AT(17,45),FAC(HEX(8C)),LABEL$(4!
7680 ),AT(17,73),FAC(HEX(89)),STR(T9$(I,J),12,3),                     !
7690        AT(18,5),FAC(HEX(8C)),LABEL$(5),AT(18,33),FAC(HEX(89)),   !
7700                 STR(T9$(I,J),15,3),AT(18,45),FAC(HEX(8C)),LABEL$(!
7710 6),AT(18,73),FAC(HEX(89)),STR(T9$(I,J),18,3),                     !
7720        AT(19,5),FAC(HEX(8C)),LABEL$(7),AT(19,33),FAC(HEX(89)),   !
7730                 STR(T9$(I,J),21,3),                              !
7740        AT(21,20),"NOTE - 'NNN' MEANS THAT THE PRECEDENT NODE IS B!
7750 ARRED",                                                          !
7760        AT(24,5),"TO ENTER CHANGES PRESS                 'ENTER'", !
7770 KEYS(BIN(0))
7780 IF Z4$ = "YES" THEN Q12 = Q12 + 1 ELSE JMP270
7790 CONVERT I TO STR(T11$(Q12),24,1),PIC(#)
7800 CONVERT J TO STR(T11$(Q12),25,1),PIC(#)
7810 STR(T11$(Q12),1,23) = STR(T9$(I,J),1,23)
7820 JMP270:NEXT J
7830 NEXT I
7840 IF Z4$ = "YES" THEN STR(ROUTE$,6,1) = "A"
7850 IF Z4$ = "YES" THEN GOTO JMP280 ELSE GOTO JMP190
7860 JMP280:IF A = D2 THEN JMP290
7870 IF Z4$="YES" AND STR(ROUTE$,7,1)<>HEX(20) THEN JMP290
7880 B = R03:C = R04:D = R05
7890 ACCEPT AT(4,70),FAC(HEX(94)),G4$,                                !
7900        AT(5,10),"YOU HAVE REQUESTED A CHANGE IN RETENTION FOR",  !
7910        AT(5,55),FAC(HEX(8C)),A$,CH(21),                          !
7920        AT(6,10),"IN THE",AT(6,17),FAC(HEX(8C)),TYPE$(Q11),CH(23),!
7930        AT(6,18+LEN(TYPE$(Q11))),"COMMUNITY",                     !
7940        AT(7,10),"THIS WILL CAUSE A CHANGE IN THE CONTINUATION VEC!
7950 TOR.  THE FOUR",                                                 !
7960        AT(8,10),"PARAMETERS WHICH DEFINE THIS VECTOR ARE DISPLAYE!
7970 D BELOW FOR",                                                    !
7980        AT(9,10),"REVIEW AND/OR CHANGE",                          !
7990        AT(12,10),"RETENTION",AT(12,45),D2,PIC(##),AT(12,48),     !
8000                  "PER CENT",                                     !
8010        AT(14,10),"MINIMUM SERVICE REQUIREMENT",AT(14,45),R03,    !
8020                  PIC(##),AT(14,48),"YEARS",                      !
8030        AT(16,10),"RETENTION POINT",AT(16,45),R04,PIC(##),        !
8040        AT(16,48),"YEARS",                                        !
8050        AT(18,10),"CAREER STABLE POINT",AT(18,45),R05,PIC(##),    !
8060        AT(18,48),"YEARS",                                        !
8070        AT(21,10),"***********************************************!
8080 **************",                                                 !
8090        AT(23,10),"PRESS ENTER TO MAKE CONTINUATION VECTOR CHANGES!
8100 ",                                                               !
```

```
8110 KEYS(BIN(0))
8120 JMP280:R03 = B:R04 = C:R05 = D:R02=D2/100
8130 IF Z4$ = "YES" THEN STR(ROUTE$,7,1) = "A" ELSE GOTO JMP410
8140 GOTO JMP380
```

SECTION III: MULTIPLE RUN SET UP ROUTINES

```
8160 ************************************************************************
8170 *             MULTIPLE RUN SET UP ROUTINES PERMIT SELECTING          *
8180 *     GROUPS OF SUBCOMMUNITIES WHICH HAVE SIMILAR CHARACT-           *
8190 *     ERISTICS FOR SEQUENTIAL SOLUTION WITHOUT USER INTER-           *
8200 *     VENTION.  ANY NUMBER OF GROUPS MAY BE SPECIFIED.  THE          *
8210 *     DEFAULT GROUPING CORRESPONDS TO THE PRESENT UNDER-             *
8220 *     GRADUATE TRAINING PIPELINES.                                   *
8230 ************************************************************************
8240 JMP300:/*MULTIPLE RUN SETUP ROUTINE*/
8250 IF L6=16 THEN GOSUB' 85
8260 L6=0
8270 INIT(HEX(20))GROUP$,TGROUP$,ROUTE$,EM$
8280 Z4$ = "YES"
8290 BGROUP$ = "AAABAACBCCBADCOODEEEEOGOOGESOO"
8300 ACCEPT AT(2,22),"NAVAL AVIATOR COMMUNITY SELECTIONS",                !
8310           AT(2,70),FAC(HEX(94)),G4$,                                   !
8320           AT(3,32),"(MULTIPLE RUNS)",                                  !
8330           AT(5,10),"YOU MAY ARRANGE AVIATOR SUBCOMMUNITIES INTO GROU!
8340 PS WITH",                                                              !
8350           AT(6,10),"SIMILAR CHARACTERISTICS TO SIMPLIFY THE PROCESS !
8360 OF DEFINING",                                                          !
8370           AT(7,10),"PARAMETERS.  ASSIGN A SINGLE CHARACTER GROUP IDE!
8380 NTIFIER TO",                                                           !
8390           AT(8,10),"EACH SUBCOMMUNITY BELOW.  ASSIGNMENT OF 'ZERO' O!
8400 R 'SPACE'",                                                            !
8410           AT(9,10),"WILL ELIMINATE THAT SUBCOMMUNITY FROM THE RUN",  !
8420           AT(11,10),"COMMUNITY",AT(11,33),"GROUP",AT(11,50),"COMMUNI!
8430 TY",AT(11,73),"GROUP",                                                 !
8440           AT(13,8),"LIGHT ATTACK",AT(13,35),STR(GROUP$,1,1),AT(13,48!
8450 ),"MARITIME PATROL",AT(13,75),STR(GROUP$,8,1),                         !
8460           AT(14,8),"FIGHTER",AT(14,35),STR(GROUP$,2,1),AT(14,48),"LA!
8470 MPS MK I",AT(14,75),STR(GROUP$,9,1),                                   !
8480           AT(15,8),"MEDIUM ATTACK",AT(15,35),STR(GROUP$,3,1),          !
8490 AT(15,48),"LAMPS MK III",AT(15,75),STR(GROUP$,10,1),                   !
8500           AT(16,8),"EARLY WARNING - VAW",AT(16,35),STR(GROUP$,4,1),  !
8510 AT(16,48),"ELECTRONIC WARFARE - VQ",AT(16,75),STR(GROUP$,11,1),      !
8520     AT(17,8),"ELECTRONIC WARFARE - VAQ",AT(17,35),STR(GROUP$,5,1),!
8530      AT(17,48),"FORCE SUPPORT - JET",AT(17,75),STR(GROUP$,12,1),      !
8540           AT(18,8),"CARRIER BASED ASW",AT(18,35),STR(GROUP$,6,1),     !
8550 AT(18,48),"FORCE SUPPORT - PROP",AT(18,75),STR(GROUP$,13,1),         !
8560           AT(19,8),"HELICOPTER ASW",AT(19,35),STR(GROUP$,7,1),        !
8570 AT(19,48),"FORCE SUPPORT - HELO",AT(19,75),STR(GROUP$,14,1),         !
8580           AT(21,10),"RUN DESCRIPTION: ",AT(21,30),EM$,                 !
8590           AT(23,10),"TO RETURN TO BASIC MENU                 - PRESS", !
8600 AT(23,60),"PF-16",                                                     !
8610           AT(24,10),"TO CONTINUE WITH NEO SUBCOMMUNITIES   - PRESS", !
8620 AT(24,60),"'ENTER'",                                                   !
8630 KEYS(BIN(0)&BIN(16)),KEY(M5),NOALT GOTO JMP310
8640 IF M5 = 16 THEN Z4$ = "NO" ELSE GOTO JMP320
```

SECTION III: MULTIPLE RUN SET UP ROUTINES

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8650 INIT(HEX(20))G4$
8660 GOTO JMP110
8670 JMP310:IF M5 = 16 THEN Z4$ = "NO"
8680 IF M5 = 16 THEN JMP110
8690 STR(GROUP$,1,15) = STR(BGROUP$,1,15):Q=1
8700 JMP320:/*NFO GROUP SELECTION*/
8710 ACCEPT AT(2,20),"NAVAL FLIGHT OFFICER COMMUNITY SELECTIONS",
8720            AT(2,70),FAC(HEX(94)),G4$,
8730            AT(3,33),"(MULTIPLE RUNS)",
8740            AT(5,10),"NAVAL FLIGHT OFFICER SUBCOMMUNITIES MAY ALSO BE
8750 GROUPED",
8760            AT(6,10),"BY ASSIGNING GROUP IDENTIFIERS.  USE CAUTION IN
8770 ASSIGNING",
8780            AT(7,10),"GROUP IDENTIFIERS.  IF IDENTIFIER IS THE SAME AS
8790  ONE USED",
8800            AT(8,10),"FOR PILOTS THAT NFO SUBCOMMUNITY WILL BE INCLUDE
8810 D WITH THE",
8820            AT(9,10),"PREVIOUSLY DEFINED PILOT GROUP",
8830            AT(11,32),"COMMUNITY",AT(11,53),"GROUP",
8840            AT(13,25),"FIGHTER",AT(13,55),STR(GROUP$,17,1),
8850            AT(14,25),"MEDIUM ATTACK",AT(14,55),STR(GROUP$,18,1),
8860            AT(15,25),"EARLY WARNING - VAW",AT(15,55),STR(GROUP$,19,1)
8870 ,          AT(16,25),"ELECTRONIC WARFARE - VAQ",AT(16,55),
8880             STR(GROUP$,20,1),
8890            AT(17,25),"CARRIER BASED ASW",AT(17,55),STR(GROUP$,21,1),
8900            AT(18,25),"MARITIME PATROL",AT(18,55),STR(GROUP$,23,1),
8910            AT(19,25),"ELECTRONIC WARFARE - VQ",AT(19,55),
8920                            STR(GROUP$,26,1),
8930            AT(20,25),"FORCE SUPPORT - JET",AT(20,55),STR(GROUP$,27,1)
8940 ,
8950            AT(21,25),"FORCE SUPPORT - PROP",AT(21,55),
8960             STR(GROUP$,28,1),
8970            AT(23,10),"TO RETURN TO BASIC MENU                  -  PRESS"
8980 ,AT(23,58),"PF-16",
8990            AT(24,10),"TO CONTINUE MULTIPLE COMMUNITY RUN       -  PRESS"
9000 ,AT(24,58),"ENTER",
9010 KEYS(BIN(0)&BIN(16)),KEY(M5),NOALT GOTO JMP330
9020 IF M5 = 16 THEN Z4$ = "NO" ELSE GOTO JMP340
9030 INIT(HEX(20))G4$
9040 GOTO JMP110
9050 JMP330:IF M5 = 16 THEN Z4$ = "NO"
9060 IF M5 = 16 THEN JMP110
9070 STR(GROUP$,16,15) = STR(BGROUP$,16,15)
9080 IF Q = 1 THEN JMP370
9090 JMP340:/*ELIMINATE BLANKS*/
9100 L1 = 1
9110 IF STR(GROUP$,1,1)="0" AND POS(STR(GROUP$,2,14)<>" ")=0 THEN
9120      INIT("0")STR(GROUP$,1,15)
9130 IF STR(GROUP$,17,1)="0" AND POS(STR(GROUP$,18,13)<>" ")=0 THEN
9140      INIT("0")STR(GROUP$,16,15)
```

SECTION III: MULTIPLE RUN SET UP ROUTINES

```
9150 IF POS(GROUP$<>"0")=0 THEN JMP300
9160 FOR Q = 1 TO 30
9170 IF STR(BGROUP$,Q,1) = "0" THEN STR(GROUP$,Q,1) = "0"
9180 IF STR(GROUP$,Q,1)<>" " THEN JMP360
9190 FOR K = 1 TO 30
9200 IF STR(GROUP$,K,1) <> STR(BGROUP$,Q,1) THEN JMP350
9210 STR(GROUP$,Q,1) = STR(BGROUP$,Q,1)
9220 GOTO JMP360
9230 JMP350:NEXT K
9240 CONVERT L1 TO STR(GROUP$,Q,1),PIC(#)
9250 FOR K = Q+1 TO 30
9260 IF (STR(BGROUP$,K,1)=STR(BGROUP$,Q,1)) AND (STR(GROUP$,K,1)=" ") !
9270 THEN STR(GROUP$,K,1) = STR(GROUP$,Q,1)
9280 NEXT K
9290 L1 = L1 + 1
9300 JMP360:NEXT Q
9310 JMP370:COM$ = "PRESS PF-10 IF YOU WANT TO BYPASS THIS SCREEN FOR !
9320 THIS GROUP"
9330 STR(G4$,1,6) = "GROUP "
9340 TGROUP$ = GROUP$
9350 O12 = 0:INIT(HEX(20))T11$()
9360 FOR P = 1 TO 30
9370 IF STR(TGROUP$,P,1) = " " OR STR(TGROUP$,P,1) = "0" THEN JMP400
9380 G5$ = STR(TGROUP$,P,1)
9390 STR(G4$,7,1) = G5$
9400 INIT(HEX(20))ROUTE$
9410 INIT(HEX(20))P2$()
9420 L4 = 1
9430 FOR Q = 1 TO 30
9440 IF STR(GROUP$,Q,1) <> G5$ THEN GOTO JMP380
9450 M = Q
9460 IF M > 15 THEN O11 = M - 15 ELSE O11 = M
9470 GOTO JMP180
9480 JMP380:CONVERT M TO M$,PIC(##)
9490 OPEN NODISPLAY #1,IO,FILE="SOURCE",LIBRARY="OFFREQ",            !
9500 VOLUME="VOL555"
9510 OPEN NODISPLAY #2,IO,FILE="CAREER",LIBRARY="OFFREQ",            !
9520 VOLUME="VOL555"
9530 WRITE #1,USING FILEFORM,M$,O11,S,S1,Z1$,Z2$,Z3$,A$,TYPE$(O11),   !
9540 S1(O11,1),S1(O11,2),S1(O11,3),S1(O11,S),GO(O11,S1),GO(O11,S1+1), !
9550 GO(O11,S1+2),DAT,D2,GO(O11,S1+6),GO(O11,S1+7),GO(O11,S1+8),      !
9560 TCO(A1(O11,S-3),2),TCO(A1(O11,S-3),3),TCO(A1(O11,S-3),4),        !
9570 TCO(A1(O11,S-3),5),PO(1),PO(2),PO(3),A1(O11,S1+2),A1(O11,S1+3),  !
9580 A1(O11,S1+4),A1(O11,9),RO1,RO2,RO3,RO4,RO5
9590 WRITE #2 USING FILECAR,M$,O12,T11$(),PRO4,PRO5
9600 STR(TGROUP$,Q,1) = " "
9610 STR(P2$(L4),1,22) = TYPE$(O11)
9620 IF M>15 THEN STR(P2$(L4),25,5)="(NFO)" ELSE STR(P2$(L4),25,4)=   !
9630 "(NA)"
9640 L4 = L4+1
```

SECTION III: MULTIPLE RUN SET UP ROUTINES

```
9650 CLOSE #1
9660 CLOSE #2
9670 JMP390:NEXT Q
9680 ACCEPT AT(5,32),FAC(HEX(8C)),G4$,AT(5,40),"COMPLETED",                 !
9690            AT(7,28),"SUBCOMMUNITIES INCLUDED",                           !
9700            AT(10,25),FAC(HEX(8C)),P2$(1),                                !
9710            AT(11,25),FAC(HEX(8C)),P2$(2),                                !
9720        AT(12,25),FAC(HEX(8C)),P2$(3),AT(13,25),FAC(HEX(8C)),P2$(4),     !
9730        AT(14,25),FAC(HEX(8C)),P2$(5),AT(15,25),FAC(HEX(8C)),P2$(6),     !
9740        AT(16,25),FAC(HEX(8C)),P2$(7),AT(17,25),FAC(HEX(8C)),P2$(8),     !
9750        AT(18,25),FAC(HEX(8C)),P2$(9),AT(19,25),FAC(HEX(8C)),P2$(10),    !
9760            AT(23,10),"TO CONTINUE WITH NEXT GROUP PRESS",AT(23,66),     !
9770            "PRESS 'ENTER'",                                              !
9780            AT(24,10),"TO REINITIATE THE GROUP SELECTION PROCESS PRESS!
9790 ",AT(24,66),"'PF-16'",                                                   !
9800 KEYS (BIN(0)&BIN(16)),KEY(L6)
9810 IF L6 = 16 THEN JMP300
9820 JMP400:NEXT P
9830 MAT TOT = ZER:MAT TOTA = ZER:MAT TOTN = ZER
9840 INIT(HEX(20))MGROUP$
9850 TGROUP$ = GROUP$
9860 FOR I4 = 1 TO 30
9870 IF STR(BGROUP$,I4,1)="0" THEN JMP1640
9880 IF STR(TGROUP$,I4,1)="0" THEN STR(MGROUP$,I4,1)="X"
9890 IF STR(TGROUP$,I4,1)="0" OR STR(TGROUP$,I4,1)="#" THEN JMP1640
9900 G5$ = STR(TGROUP$,I4,1)
9910 FOR I5 = 1 TO 30
9920 CONVERT I5 TO I$,PIC(##)
9930 IF STR(GROUP$,I5,1) <> G5$ THEN JMP1630
9940 OPEN NODISPLAY #1,IO,FILE="SOURCE",LIBRARY="OFFREQ",VOLUME="VOL55!
9950 5"
9960 OPEN NODISPLAY #2,IO,FILE="CAREER",LIBRARY="OFFREQ",VOLUME="VOL55!
9970 5"
9980 READ #1,KEY=I$,USING FILEFORM,M$,Q11,S,S1,Z1$,Z2$,Z3$,                 !
9990 A$,TYPE$(Q11),S1(Q11,1),S1(Q11,2),S1(Q11,3),S1(Q11,5),                 !
10000 GO(Q11,S1),GO(Q11,S1+1),GO(Q11,S1+2),DAT,D2,GO(Q11,S1+6),             !
10010 GO(Q11,S1+7),GO(Q11,S1+8),TCO(A1(Q11,S-3),2),TCO(A1(Q11,S-3),3),      !
10020 TCO(A1(Q11,S-3),4),TCO(A1(Q11,S-3),5),PO(1),PO(2),PO(3),              !
10030 A1(Q11,S1+2),A1(Q11,S1+3),A1(Q11,S1+4),A1(Q11,9),                     !
10040 RO1,RO2,RO3,RO4,RO5
10050 CLOSE #1
10060 READ #2,KEY=I$,USING FILECAR,M$,Q12,T11$(),PRO4,PRO5
10070 CLOSE #2
10080 CONVERT M$ TO M
10090 IF Q12 = 0 THEN JMP410
10100 FOR K = 1 TO Q12
10110 CONVERT STR(T11$(K),24,1) TO I
10120 CONVERT STR(T11$(K),25,1) TO J
10130 STR(T9$(I,J),1,23) = STR(T11$(K),1,23)
10140 NEXT K
```

SECTION III: MULTIPLE RUN SET UP ROUTINES

```
10150 JMP'410:
10160 B32 = 1
10170 FOR I = 1 TO 7
10180 FOR J = B32 TO B32 + NO(I) - 1
10190 RO(J) = A50(I)
10200 NEXT J
10210 B32 = B32 + NO(I)
10220 NEXT I
10230 E = SQR(RO2/RO(1))
10240 FOR I = RO3 + 1 TO RO4
10250 RO(I) = E
10260 NEXT I
10270 E = .924*(((.45 + RO2)/(2*RO2))**.12)
10280 FOR I = RO4 + 1 TO RO5
10290 RO(I) = E
10300 NEXT I
10310 GOSUB' 63
```

```
10330 ************************************************************
10340 *                                                          *
10350 *       MODIFICATION OF DATA COMPLETE, BEGIN REQUIREMENTS  *
10360 *       COMPUTATION>                                       *
10370 *                                                          *
10380 ************************************************************
10390 MAT DO = ZER:DAT=DAT/100
10400 IF M > 15 THEN P=4 ELSE P=1
10410 IF M>15 THEN B=5 ELSE B=4
10420 /*FLEET TOURS*/
10430 DO(1,1) = S1(Q11,1)*S1(Q11,2)*S1(Q11,3)*S1(Q11,B)*(GO(Q11,P)+
10440   GO(Q11,P+1))*S1(Q11,1)+AUX(Q11,P+2)+A1(Q11,P+4)*S1(15,1)*
10450   GO(15,P+2)
10460 DO(1,2) = GO(Q11,P+1)*S1(Q11,1)+AUX(Q11,P+1)+A1(Q11,P+4)*S1(15,1)
10470   *GO(15,P+1)
10480 DO(1,3) = GO(Q11,P)*S1(Q11,1)+AUX(Q11,P)
10490 DO(1,4) = A1(Q11,P+4)*S1(15,1)*GO(15,P)
10500 /* FRS TOURS */
10510 DO(2,1) = GO(Q11,P+8)
10520 DO(2,2) = GO(Q11,P+7)
10530 A=2
10540 IF GO(Q11,10)>0 THEN A=1
10550 IF GO(Q11,7)=0 THEN A=0
10560 IF M>15 AND GO(Q11,10)=0 THEN A=0
10570 DO(2,3) = GO(Q11,P+6)-A
10580 DO(2,4) = A
10590 /* TRAINING COMMAND TOURS (LESS FIRST TOUR) */
10600 IF M>15 THEN A=2 ELSE A=1
10610 DO(3,2) = A1(Q11,P+3)*TCO(A1(Q11,A),3)
10620 DO(3,3) = A1(Q11,P+3)*TCO(A1(Q11,A),2)
10630 /* OTHER REQUIREMENTS */
10640 IF M>15 THEN B=9 ELSE B=5
10650 FOR I = 1 TO 3
10660 IF I=3 THEN N=I+4 ELSE N=I+3
10670 FOR J = 1 TO 4
10680 DO(N,J) = A1(Q11,P+2)*OTH(I,B+J)
10690 NEXT J
10700 NEXT I
```

SECTION V: NETWORK SOLUTION ROUTINES

```
10720 ****************************************************************
10730 *                                                              *
10740 *          BASIC REQUIREMENTS COMPUTATION COMPLETE.            *
10750 *      BEGIN NETWORK SOLUTION PROCEDURE.  THE MATRIX           *
10760 *      DO( ) IS NOW LOADED WITH ALL VALUES EXCEPT TRACOM       *
10770 *      FIRST TOUR AND PROFESSIONAL EDUCATION.  BEGIN           *
10780 *      CALCULATION OF ENTRIES TO INVT MATRIX, INVTO IS         *
10790 *      WORKING FILE.                                           *
10800 *            INVT(8,-) = TOTAL LINE                            *
10810 *            INVT(9,-) = CUMULATIVE INVENTORY LINE             *
10820 *                                                              *
10830 ****************************************************************
10840 D2 = 0
10850 IF M < 15 THEN L = 1 ELSE L = 2
10860 FOR I = 1 TO 7
10870 Q38(I) = 0
10880 FOR J = 1 TO 4
10890 Q4(I,J) = DO(I,J)
10900 NEXT J
10910 NEXT I
10920 FOR J = 1 TO 4
10930 FOR I = 1 TO 7
10940 D2 = D2 + DO(I,J)
10950 NEXT I
10960 NEXT J
10970 C5 = 1:RO8 = 0
10980 FOR J = 1 TO 30
10990 RO8 = RO8 + C5*(1+RO(J))
11000 C5 = C5*RO(J)
11010 NEXT J
11020 P2 = 1
11030 FOR J = 1 TO 18
11040 P2 = P2*RO(J)
11050 IF J = 12 THEN P1 = P2
11060 NEXT J
11070 DLT = TCO(A1(Q11,L),3+L) + 2*PO(2)*P1 + PO(3)*P2 + 1/6
11080 IO = D2/((RO8/(2*(1+1/30)))-DLT)
11090 GOSUB' 53(IO)
11100 GOSUB' 67
11110 JMP11120:REM COMPUTE TRACOM FIRST TOUR NUMBERS.
11120 IF M<15 THEN L=1 ELSE L=2
11130 DO(3,1)=DO(3,1)+TCO(A1(Q11,L),3+L)*INVTO(31)
11140 /*COMPUTE PROFESSIONAL EDUCATION NUMBERS*/
11150 DO(6,1) = DO(6,1) + PO(2)*INVTO(12)*2
11160 DO(6,2) = DO(6,2) + PO(3)*INVTO(18)*1/3
11170 DO(6,3) = DO(6,3) + PO(3)*INVTO(18)*1/3
11180 DO(6,4) = DO(6,4) + PO(3)*INVTO(18)*1/3
11190 D80=0
11200 FOR J = 1 TO 4
```

```
11210 D8(J) = 0
11220 FOR I = 1 TO 7
11230 D8(J) = D8(J) + DO(I,J)
11240 NEXT I
11250 D8O = D8O + D8(J)
11260 NEXT J
11270 /* COMPUTE FRONT END NUMBERS */
11280 CONVERT STR(T9$(3,1),1,2)TO T12
11290 GOSUB' 55(0,T12,INVTO(31)*PO(1),3,1)
11300 DO(3,1)=ROUND((DO(3,1)-C),4)
11310 I4(3,1)=ROUND(I2,4)
11320 Q7(3,1)=T12+1
11330 T12=T12+1
11340 CONVERT INT(C2+.5) TO STR(T9$(3,1),3,3),PIC(###)
11350 FOR I=1 TO T8(1)
11360 INVT(3,I)=INVT(3,I)+T8(I+1)
11370 INVT(8,I)=INVT(8,I)-T8(I+1)
11380 NEXT I
11390 /* COMPUTE FLEET FIRST TOUR LENGTH */
11400 CONVERT STR(T9$(1,1),1,2) TO T11
11410 GOSUB' 55(T12,T11,I2,1,2)
11420 D3=C
11430 GOSUB' 55(0,T11,INVTO(31)*(1-PO(1)),1,1)
11440 IF (D3+C)<DO(1,1) THEN JMP1142            /*INCREASE T11*/
11450 IF (D3+C)=DO(1,1) THEN JMP1143
11460 JMP1141 : T11=T11-1                       /*DECREASE T11*/
11470 GOSUB' 55(T12,T11,I4(3,1),1,2)
11480 D3=C
11490 GOSUB' 55(0,T11,INVTO(31)*(1-PO(1)),1,1)
11500 IF (D3+C)<DO(1,1) THEN T11=T11+1 ELSE JMP1141
11510 GOTO JMP1143
11520 JMP1142 : T11=T11+1
11530 GOSUB' 55(T12,T11,I4(3,1).1,2)
11540 D3=C
11550 GOSUB' 55(0,T11,INVTO(31)*(1-PO(1)),1,1)
11560 IF (D3+C)>DO(1,1) THEN JMP1143 ELSE JMP1142
11570 JMP1143: GOSUB' 55(0,T11,INVTO(31)*(1-PO(1)),1,1)
11580 GOSUB' 61(0,INVTO(31)*(1-PO(1)),1,1,1)
11590 DO(1,1)=ROUND((DO(1,1)-C),4)
11600 I4(1,1)=ROUND(I2,4)
11610 Q7(1,1)=T11+7
11620 CONVERT INT(C2+.5) TO STR(T9$(1,1),3,3),PIC(###)
11630 CONVERT T11 TO STR(T9$(1,1),1,2),PIC(##)
11640 CONVERT T11 TO STR(T9$(1,2),1,2),PIC(##)
11650 GOSUB' 55(T12,T11,I4(3,1),1,2)
11660 FOR I=1 TO T8(I)
11670 INVT(1,INT(T12/12+I))=INVT(1,INT(T12/12+I))+T8(I+1)
11680 INVT(8,INT(T12/12+I))=INVT(8,INT(T12/12+I))-T8(I+1)
11690 IF INVT(8,INT(T12/12+I))<0 THEN INVT(8,INT(T12/12+I))=0
11700 NEXT I
```

```
11710 DO(1,1)=DO(1,1)-C
11720 IF DO(1,1)<0 THEN DO(1,1)=0
11730 DO(1,1)=ROUND(DO(1,1),5)
11740 I4(1,2)=ROUND(I2,4)
11750 Q7(1,2)=T12+T11+7
11760 CONVERT INT(C2+.5) TO STR(T9$(1,2),6,3),PIC(###)
11770 T13=T11+7
11780 /* DISTRIBUTE FIRST TOUR OUTPUT */
11790 S10=1
11800 MAT T6 = ZER
11810 T6(2) = I4(1,1)
11820 FOR I = 2 TO 7
11830 CONVERT STR(T9$(I,2),1,2) TO T2
11840 IF DO(I,1) <= 0 THEN JMP1200
11850 IF STR(T9$(I,2),3,3) = "NNN" THEN JMP1200
11860 IF T6(I) <= 0 THEN JMP1200
11870 /* COMPUTE FLOWS */
11880 IF I=6 THEN JMP1210
11890 GOSUB' 55(T13,T2,T6(I),I,2)
11900 GOSUB' 61(T13,T6(I),I,2,1)
11910 GOTO JMP1220
11920 JMP1210 : /*PROFESSIONAL DEVELOPMENT*/
11930 GOSUB' 60(T13,T2,T6(I),2,1)
11940 JMP1220 : /*COLLECT RESULTS*/
11950 DO(I,1)=ROUND((DO(I,1)-C),5)
11960 I4(I,2)=I4(I,2)+ROUND(I2,4)
11970 Q7(I,2)=T11+T2+8
11980 CONVERT STR(T9$(I,2),3,3) TO D2
11990 CONVERT (D2+INT(C2+.5)) TO STR(T9$(I,2),3,3),PIC(###)
12000 T6(I+1)=T6(I+1)+DLT
12010 GOTO JMP1230
12020 JMP1200:C = 0:C2 = 0:I2 = 0
12030 T6(I+1) = T6(I+1) + T6(I)
12040 Q7(I,2)=T11+T2+8
12050 JMP1230:NEXT I
12060 /*COMPUTE OUT OF AVIATION*/
12070 IF T6(8)<=0 THEN JMP1250
12080 CONVERT STR(T9$(7,2),1,2) TO T2
12090 GOSUB' 55(T13,T2,T6(8),9,2)
12100 GOSUB' 61(T13,T6(8),9,2,1)
12110 OUTA(2)=OUTA(2)+C2
12120 I4(7,2)=I4(7,2)+ROUND(I2,4)
12130 JMP1250 : /*END SECOND TOUR COMPUTATIONS*/
12140 IF Z1$<>"YES" THEN JMP1350
12150 C$="AT END TOUR TWO"
12160 STOP "END TOUR TWO - PF 14 FOR DATA"
12170 JMP1350 : /*BEGIN ITERATION ON J*/
12180 /* MAXIMAL FLOW ALGORITHM */
12190 FOR J = 3 TO 7                                          /* TOUR NUMBER */
12200 MAT T6 = ZER:MAT T7 = ZER:MAT I40 = ZER
```

```
12210 MAT I41 = ZER:MAT R2 = ZER
12220 FOR N = 1 TO 7                                                   /* SOURCE NODE */
12230 T13 = Q7(N,J-1)                                                  /* START TIME */
12240 IF T13<PRO4 THEN S10 = 1
12250 IF T13>=PRO4 AND T13<PRO5 THEN S10 = 2
12260 IF T13>=PRO5 AND T13<=PRO5+48 THEN S10 = 3
12270 IF T13>PRO5+48 THEN S10 = 4
12280 FOR I = 1 TO 7                                                  /*DEST. NODE */
12290 IF I4(N,J-1)=0 THEN JMP1360
12300 IF STR(T9$(I,J),3*N,3)="NNN" THEN JMP1360
12310 CONVERT STR(T9$(I,J),1,2) TO T2
12320 IF J=7 THEN T2 = 311-Q7(N,J-1)
12330 GOSUB' 55(T13,T2,I4(N,J-1),I,J)
12340 T7(I)=(C2/C)*D0(I,S10)
12350 I40(N,I) = C2                                       /* INTERIOR NETWORK FLOW */
12360 R2(N,I) = I4(N,J-1)/C2
12370 JMP1360:IF STR(T9$(I,J),3*N,3) = "NNN" THEN I40(N,I) = 0
12380 IF I40(N,I)>T6(N) THEN T6(N) = I40(N,I)
12390 NEXT I
12400 NEXT N
12410 IF Z1$<>"YES" THEN JMP3067
12420 C$="TOUR   - NETWORK SETUP COMPLETE"
12430 CONVERT J TO STR(C$,6,1),PIC(#)
12440 GOSUB' 16
12450 JMP3067:
12460 /* LOCAL NETWORK SET-UP  -- ASSIGN FLOWS */
12470 FOR N = 7 TO 1 STEP -1
12480 FOR I = 1 TO 7
12490 IF T6(N) = 0 THEN JMP1371
12500 IF T7(I) = 0 THEN JMP1372
12510 IF I40(N,I) = 0 THEN JMP1372
12520 IF T6(N) < I40(N,I) THEN Q5 = T6(N) ELSE Q5 = I40(N,I)
12530 IF Q5>T7(I) THEN Q5=T7(I)
12540 T6(N)=T6(N)-Q5
12550 T7(I)=T7(I)-Q5
12560 I40(N,I)=I40(N,I)-Q5
12570 I41(N,I)=I41(N,I)+Q5
12580 IF I40(N,I)=0 THEN T6(N) = 0
12590 JMP1372:NEXT I
12600 JMP1371:NEXT N
12610 /* PRELIMINARY ASSIGNMENT COMPLETE */
12620 /* CHECK T6/T7 FOR NULL */
12630 JMP1363:K1,K2=0
12640 FOR N = 1 TO 7
12650 IF T6(N)>0 THEN K1=N
12660 IF T7(N)>0 THEN K2=N
12670 NEXT N
12680 IF K1=0 OR K2=0 THEN JMP1361                          /* MAX FLOW - OUT */
12690 /* FLOW NOT MAX - DEVELOP ALTERNATE PATHS */
12700 /* SET COUNTERS */
```

```
12710 MAT T19=ZER:MAT T21=ZER:MAT T18=ZER:MAT T22=ZER:MAT T17=ZER
12720 T19(K1) = 1:L5 = 1
12730 IF T6(K1)>T7(K2) THEN Q5 = T7(K2) ELSE Q5 = T6(K1)
12740 N1 = K1:I3=1
12750 T17(K1)=1
12760 JMP1362:IF I40(N1,K2)<=0 THEN JMP1367
12770 IF I40(N1,K1)<Q5 THEN Q5 = I40(N1,K2)
12780 T18(L5)=K2:T22(L5)=Q5
12790 GOTO JMP1365
12800 JMP1367:IF I3>=8 THEN JMP1354
12810 FOR I = I3 TO 7
12820 IF T21(I) = 1 THEN JMP1364                              /* NEXT I */
12830 IF I40(N1,I)<=0 THEN JMP1364
12840 IF Q5>I40(N1,I) THEN Q5 = I40(N1,I)
12850 T21(I) = 1
12860 T18(L5) = I:T22(L5) = Q5:I1=I:N2=1
12870 IF L5<49 THEN JMP1359
12880 JMP1358:CALL "OFFPRIN" ("ARC COUNTER EXCEEDED",1)
12890 GOTO JMP100
12900 JMP1359:L5=L5+1
12910 GOTO JMP1366                                         /*GO TO N SCAN*/
12920 JMP1364:NEXT I
12930 /* NO SATISFACTORY PATH FROM N1 */
12940 JMP1354:IF L5 = 1 THEN JMP1351
12950 L5 = L5-1
12960 N2 = T18(L5)+1
12970 I1 = T18(L5-1)
12980 Q5 = T22(L5-1)
12990 JMP1366:/* MOVE TO FORWARD N SCAN */
13000 IF N2>=8 THEN JMP1353
13010 FOR N = N2 TO 7
13020 IF T19(N) = 1 THEN JMP1368
13030 IF I41(N,I1)<=0 THEN JMP1368
13040 IF Q5>I41(N,I1) THEN Q5 = I41(N,I1)
13050 T19(N) = 1
13060 T18(L5)=N:T22(L5)=Q5:N1=N:I3=1
13070 IF L5>=49 THEN JMP1358
13080 L5=L5+1
13090 GOTO JMP1362
13100 JMP1368:NEXT N
13110 /* NO SATISFACTORY PATH FROM I1 */
13120 JMP1353:L5=L5-1
13130 IF L5 = 1 THEN JMP1351
13140 I3 = T18(L5)+1
13150 N1 = T18(L5-1)
13160 Q5=T22(L5-1)
13170 GOTO JMP1362
13180 JMP1351:FOR N = 1 TO 7
13190 IF T6(N)<=0 THEN JMP1352
13200 IF T17(N)>0 THEN JMP1352
```

```
13210 K1 = N
13220 T17(N)=1
13230 MAT T18=ZER:MAT T19=ZER:MAT T21=ZER:MAT T22=ZER
13240 T19(K1)=1:N1=K1:I3=1
13250 GOTO JMP1362
13260 JMP1352:NEXT N
13270 GOTO JMP1361
13280 JMP1365:/* CONNECTED PATH IN T18 */
13290 /* Q5 IS MAX AVAILABLE CAPACITY */
13300 T6(K1) = T6(K1)-Q5
13310 T7(K2) = T7(K2)-Q5
13320 N1 = K1:L6=1
13330 JMP1379:I40(N1,T18(L6))=I40(N1,T18(L6))-Q5
13340 I41(N1,T18(L6))=I41(N1,T18(L6))+Q5
13350 IF L6=L5 THEN JMP1363
13360 L6=L6+1
13370 I41(T18(L6-1),T18(L6))=I41(T18(L6-1),T18(L6))-Q5
13380 I40(T18(L6-1),T18(L6))=I40(T18(L6-1),T18(L6))+Q5
13390 N1 = T18(L6)
13400 L6=L6+1
13410 GOTO JMP1379
13420 JMP1361:/* DISTRIBUTE FLOWS */
13430 MAT T7 = ZER:MAT I42 = ZER
13440 Q45,Q46=0
13450 FOR N = 1 TO 7
13460 FOR I = 1 TO 7
13470 I41(N,I)=I41(N,I)*R2(N,I)
13480 NEXT I
13490 T6(N) = I4(N,J-1)
13500 Q45 = Q45 + Q7(N,J-1)*I4(N,J-1)
13510 Q46 = Q46 + I4(N,J-1)
13520 NEXT N
13530 Q71 = Q45/Q46
13540 IF Z1$<>"YES" THEN JMP9068
13550 INIT(HEX(20))C$
13560 C$ = "TOUR     MAXIMAL FLOW SOLUTION REACHED"
13570 CONVERT J TO STR(C$,6,1),PIC(#)
13580 GOSUB' 16
13590 JMP9068:
13600 /* T6 CONTAINS ACTUAL FLOWS */
13610 /* COMPUTE FLOWS */
13620 MAT I40 = ZER
13630 MAT T7 = ZER:MAT T8 = ZER
13640 FOR N = 1 TO 7
13650 T13 = Q7(N,J-1)
13660 FOR I = 7 TO 1 STEP -1
13670 IF STR(T9$(I,J),3*N,3)="NNN" THEN JMP1370
13680 IF D0(I,S10)<=0 THEN JMP1370
13690 IF I41(N,I)<=0 THEN JMP1370
13700 CONVERT STR(T9$(I,J),1,2) TO T2
```

```
13710 IF J = 7 THEN T2 = 311-Q7(N,J-1)
13720 DLT=0
13730 FOR K = 1 TO 5
13740 T14 = T13-9+3*K
13750 IIN = I41(N,I)*FA1(K)+DLT
13760 GOSUB' 55(T14,T2,IIN,I,J)
13770 GOSUB' 61(T14,IIN,I,J,S10)
13780 DO(I,S10)=ROUND((DO(I,S10)-C),4)
13790 I4(I,J)=I4(I,J)+ROUND(I2,4)
13800 I40(N,I)=I40(N,I)+Q8*T14
13810 I42(N,I) = I42(N,I) + Q8
13820 CONVERT STR(T9$(I,J),3*N,3) TO D2
13830 CONVERT (D2+INT(C2+.5)) TO STR(T9$(I,J),3*N,3),PIC(###)
13840 T6(N)=T6(N)-Q8
13850 NEXT K
13860 JMP1370:NEXT I
13870 /* CHECK UPWARD DETAILING */
13880 IF Z3$ <> "YES" THEN JMP1400
13890 IF DAT = 0 THEN JMP1400
13900 IF T6(N)<=0 THEN JMP1400
13910 T6(8) = T6(N):T6(N)=0
13920 GOSUB' 66(T13,N,J,S10)
13930 T6(N) = T6(8)
13940 JMP1400:NEXT N
13950 FOR I = 1 TO 7
13960 IF I = 1 THEN TD = 5 ELSE TD = 1
13970 L5 = 0:Q5 = 0:Q3 = 0
13980 FOR N = 1 TO 7
13990 IF I40(N,I) <= 0 THEN JMP1401
14000 Q5=Q5+I40(N,I)
14010 Q3=Q3+I42(N,I)
14020 JMP1401:NEXT N
14030 CONVERT STR(T9$(I,J),1,2) TO T2
14040 IF Q3=0 THEN JMP1395
14050 Q7(I,J) = Q5/Q3 + T2 + TD
14060 Q7(I,J) = ROUND(Q7(I,J),0)
14070 GOTO JMP1396
14080 JMP1395:Q7(I,J) = Q71+T2+TD
14090 Q7(I,J) = ROUND(Q7(I,J),0)
14100 JMP1396:NEXT I
14110 /*COMPUTE OUT OF AVIATION*/
14120 FOR N = 1 TO 7
14130 IF T6(N)<=0 THEN JMP1415
14140 T13 = Q7(N,J-1)
14150 CONVERT STR(T9$(7,J),1,2) TO T2
14160 IF J=7 THEN T2=311-Q7(N,J-1)
14170 GOSUB' 55(T13,T2,T6(N),9,J)
14180 GOSUB' 61(T13,T6(N),9,J,S10)
14190 OUTA(J)=OUTA(J)+C2
14200 I4(7,J)=I4(7,J) + ROUND(I2,4)
```

```
14210 JMP1415:NEXT N
14220 IF Z1$<>"YES" THEN JMP1416
14230 INIT(HEX(20))C$
14240 C$ = "RESULTS AT END TOUR"
14250 CONVERT J TO STR(C$,21,1),PIC(#)
14260 GOSUB' 14(C$)
14270 JMP1416:
14280 NEXT J
```

SECTION VI: ITERATION CHECK ROUTINES

```
14300 ***********************************************************************
14310 *                                                                     *
14320 *       ITERATION COMPLETE.  COMPUTE REMAINING REQUIREMENT            *
14330 *       AND DEVELOP INCREMENTAL ACCESSION REQUIREMENT.                *
14340 *       THIS IS IMPLEMENTED AS A TWO STAGE PROCESS.  ALL              *
14350 *       ACTIVITIES EXCEPT "OTHER" ARE TESTED FOR COMPLETION           *
14360 *       IN THE FIRST STAGE.  WHEN THESE REQUIREMENTS ARE              *
14370 *       MET AN OUTPUT DISPLAY IS GENERATED AND THE PROGRAM            *
14380 *       CAN THEN PROCEED TO COMPLETE THE "OTHER" REQUIREMENT          *
14390 *                                                                     *
14400 ***********************************************************************
14410 D2 = 0:S2 = 0:T1 = 12
14420 FOR J = 1 TO 4
14430 FOR I = 1 TO 6
14440 IF DO(I,J) <= 0 THEN JMP1460
14450 D2 = D2 + DO(I,J)
14460 JMP1460:NEXT I
14470 NEXT J
14480 IO = D2/(R08/(2*(1+1/30)) - 1/6)
14490 D25=IO
14500 IF IO < 1 THEN JMP1480
14510 IO = IO + INVTO(31)
14520 T50 = T50 + 1
14530 IF Z1$ <> "YES" THEN JMP1470
14540 INIT(HEX(20))C$
14550 C$ = "END ITERATION    ,         NEW ACCESSIONS"
14560 CONVERT T50 TO STR(C$,15,2),PIC(##)
14570 CONVERT ROUND(D25,1) TO STR(C$,19,5),PIC(###.#)
14580 CALL "OFFPRIN" (C$,1)
14590 JMP1470: GOSUB' 53(IO)
14600 GOSUB' 63
14610 GOSUB' 67
14620 GOTO JMP1120
14630 ***********************************************************************
14640 *                                                                     *
14650 *       FIRST STAGE REQUIREMENTS TESTING COMPLETE.  BEGIN             *
14660 *       TESTING OF "OTHER" REQUIREMENTS.                              *
14670 *                                                                     *
14680 ***********************************************************************
14690 JMP1480 : IF Z1$<>"YES" THEN JMP1485
14700 INIT(HEX(20))C$
14710 STR(C$,1,37)="ITERATION      ,         ACCESSIONS ADDED"
14720 CONVERT(T50+T51) TO STR(C$,13,2),PIC(##)
14730 CONVERT ROUND(D25,1) TO STR(C$,16,5),PIC(###.#)
14740 INIT(HEX(20))C$
14750 STR(C$,1,22) = "AT END OF     ITERATION"
14760 CONVERT(T50+T51) TO STR(C$,11,2),PIC(##)
14770 STOP C$
14780 JMP1485: IF T51 > 0 OR Z4$ = "YES" THEN JMP1490
```

SECTION VI: ITERATION CHECK ROUTINES

```
14790 E$ = "ALL REQUIREMENTS EXCEPT 'OTHER' COMPLETELY FILLED"
14800 STR(E$,65,13)  = "ITERATIONS = "
14810 CONVERT T50 TO STR(E$,78,2),PIC(##)
14820 CALL "OFFPRIN" (E$,8)
14830 JMP1490:S2 = 0:T1 = 12
14840 FOR J = 1 TO 4
14850 D2 = D2 + D0(7,J)
14860 NEXT J
14870 IO=D2/(R08/(2*(1+1/30))-1/6)
14880 D25=IO
14890 IF IO<1 AND IO<.01*D80 THEN JMP1600
14900 IO = 10 + INVTO(31)
14910 IF Z1$ <> "YES" THEN JMP1500
14920 INIT(HEX(20))C$
14930 STR(C$,1,35) = "OTHER REQUIREMENTS REMAINING =    "
14940 CONVERT ROUND(D2,1) TO STR(C$,32,5),PIC(###.#)
14950 CALL "OFFPRIN" (C$,1)
14960 CALL "OFFPRIN" (C$,8)
14970 JMP1500: GOSUB' 53(IO)
14980 T51 = T51 + 1
14990 GOSUB' 63
15000 GOSUB' 67
15010 GOTO JMP1120
15020 ***********************************************************
15030 *                                                         *
15040 *      REQUIREMENTS DETERMINATION IS COMPLETE.  DISPLAY   *
15050 *      OUTPUTS AND SELECT PRINT OPTION.  AFTER PRINT MODE *
15060 *      RESETS IN PREPARATION FOR A NEW RUN.               *
15070 *                                                         *
15080 ***********************************************************
15090 JMP1600:INIT(HEX(20))E$
15100 E$ = "ALL REQUIREMENTS MET"
15110 STR(E$,105,13) = "ITERATIONS = "
15120 CONVERT T50 TO STR(E$,118,2),PIC(##)
15130 STR(E$,120,1) = "/"
15140 CONVERT T51 TO STR(E$,121,2),PIC(##)
15150 STR(E$,130,1)=STR(TGROUP$,15,1)
15160 IF Z4$="YES" THEN STR(E$,49,40) = EM$
15170 CALL "OFFPRIN" (E$,8)
15180 IF M>15 THEN JMP1610
15190 PTR(A1(M,1)) = PTR(A1(M,1)) + INVT(R,31)
15200 PTR(A1(M,1)+7) = PTR(A1(M,1)+7) + ACC1
15210 GOTO JMP1611
15220 JMP1610:PTR(A1(M-15,2)) = PTR(A1(M-15,2)) + INVT(R,31)
15230 PTR(A1(M-15,2)+7) = PTR(A1(M-15,2)+7) + ACC1
15240 JMP1611:IF M>15 THEN MAT TOT = TOTN ELSE MAT TOT = TOTA
15250 FOR I = 1 TO 9
15260 IF I = 8 THEN JMP1603
15270 IF I<8 THEN K = I ELSE K=8
15280 FOR J = 1 TO ROUND(PRD4/12-1,0)
```

SECTION VI: ITERATION CHECK ROUTINES

```
15290 TOT(K,1) = TOT(K,1) + INVT(I,J)
15300 NEXT J
15310 FOR J = ROUND(PRO4/12,0) TO ROUND(PRO5/12-1,0)
15320 TOT(K,2) = TOT(K,2) + INVT(I,J)
15330 NEXT J
15340 FOR J = ROUND(PRO5/12,0) TO 30
15350 TOT(K,3) = TOT(K,3)+INVT(I,J)
15360 NEXT J
15370 JMP1603:NEXT I
15380 IF M>15 THEN MAT TOTN=TOT ELSE MAT TOTA = TOT
15390 MAT DO = ZER
15400 MAT Q4 = ZER
15410 MAT INVTO = ZER
15420 MAT INVT = ZER
15430 MAT Q37 = ZER
15440 MAT OUTA = ZER
15450 MAT I4 = ZER
15460 MAT Q7 = ZER
15470 FOR J = 1 TO 7
15480 FOR I = 1 TO 7
15490 T9$(I,J) = T10$(I,J)
15500 NEXT I
15510 NEXT J
15520 FOR I = 1 TO 20
15530 T5(I),T6(I),T7(I),T8(I),T15(I),T17(I),T18(I)=0
15540 NEXT I
15550 STR(T9$(1,1),1,2) = "30"
15560 STR(T9$(1,2),1,2) = "30"
15570 T50=1:T51=0:R01=0
15580 IF Z4$<>"YES" THEN JMP1650
15590 STR(TGROUP$,I5,1) = "#"
15600 JMP1630:NEXT I5
15610 JMP1640:NEXT I4
15620 CALL "OFFPRIN" (FM$,8)
15630 SELECT CRT
15640 GOSUB' 85
15650 JMP1650:GOTO JMP100
```

```
15670 *************************************************************
15680 *                                                           *
15690 *                       SUBROUTINES                         *
15700 *                                                           *
15710 *************************************************************
15720 *************************************************************
15730 *                                                           *
15740 *     #14 - THIS SUBROUTINE PROVIDES ACCESS TO THE          *
15750 *           IN-PROCESS MONITOR DISPLAYS IN RESPONSE         *
15760 *           TO TEMPORARILY INSERTED STOPS.                  *
15770 *                                                           *
15780 *************************************************************
15790 DEFFN' 14(C$)
15800 INIT(HEX(20))X$
15810 STR(X$,1,25) = STR(C$,1,25)
15820 STR(X$,28,9) = "ITERATION"
15830 CONVERT T50 TO STR(X$,38,2),PIC(##)
15840 CALL "OFFPRIN" (X$,1)
15850 RETURN
```

```
15870 **************************************************************
15880 *                                                            *
15890 *     #16 - THIS SUBROUTINE PROVIDES PRINTS OF THE SOURCE,   *
15900 *           INTER-TOUR, AND SINK FLOWS SET UP FOR THE        *
15910 *           MAXIMAL FLOW ALGORITHM.  NEEDS TC,I40,I41,T7.    *
15920 *                                                            *
15930 **************************************************************
15940 DEFFN' 16
15950 SELECT PRINTER
15960 PRINT PAGE
15970 PRINT SKIP(5);TAB(40);C$
15980 PRINT SKIP(5);TAB(11);"SOURCE";TAB(50);"FORWARD FLOWS";TAB(95);
15990 PRINT "SINK"
16000 PRINT TAB(50);"REVERSE FLOWS";SKIP(2)
16010 FOR P = 1 TO 7
16020 PRINT TAB(8);
16030 PRINT USING PRTCAR15,TC(P);
16040 PRINT TAB(20);
16050 FOR Q = 1 TO 7
16060 PRINT USING PRTCAR15,I40(P,Q);
16070 NEXT Q
16080 PRINT TAB(90);
16090 PRINT USING PRTCAR15,T7(P)
16100 PRINT TAB(20);
16110 FOR Q = 1 TO 7
16120 PRINT USING PRTCAR15,I41(P,Q);
16130 NEXT Q
16140 PRINT SKIP(2)
16150 PRTCAR15:FMT XX(3),PIC(###.#),XX(2)
16160 NEXT P
16170 SELECT CRT
16180 RETURN
```

```
16200 *******************************************************
16210 *                                                     *
16220 *     #51 - THIS SUBROUTINE RESETS GO,S1 AND A1 IN RESPONSE  *
16230 *           TO FORCE LEVEL CHANGES.   Y=1 CHANGES A COMPLETE  *
16240 *           CARRIER AIR WING.   Y>1 CHANGES SUBCOMMUNITY      *
16250 *           Y-1.                                      *
16260 *                                                     *
16270 *******************************************************
16280 DEFFN' 51(Y)
16290 MAT T5 = ZER
16300 IF Y>1 THEN JMP5150
16310 A = S1(15,1)/GO(15,13)
16320 FOR P1 = 1 TO 14
16330 IF A1(P1,5)=0 THEN JMP5192
16340 FOR Q1 = 3 TO 12 STEP 3
16350 GO(P1,Q1) = ROUND(GO(P1,Q1)*A,0)
16360 NEXT Q1
16370 S1(P1,1)=ROUND(S1(P1,1)*A,0)
16380 GO(P1,13)=S1(P1,1)
16390 T5(1) = T5(1) + A1(P1,3)
16400 T5(2) = T5(2) + A1(P1,6)
16410 T5(A1(P1,1)+2) = T5(A1(P1,1)+2) + A1(P1,4)
16420 IF A1(P1,2)>0 THEN T5(A1(P1,2)+2) = T5(A1(P1,2)+2) + A1(P1,7)
16430 JMP5192:NEXT P1
16440 FOR Q1 = 1 TO 9
16450 T5(Q1) = 1+(A-1)*T5(Q1)
16460 NEXT Q1
16470 FOR P1 = 1 TO 14
16480 IF A1(P1,5)>0 THEN JMP5193
16490 A1(P1,3) = ROUND(A1(P1,3)/T5(1),4)
16500 A1(P1,6) = ROUND(A1(P1,6)/T5(2),4)
16510 A1(P1,4) = ROUND(A1(P1,4)/T5(A1(P1,1)+2),4)
16520 IF A1(P1,2)>0 THEN A1(P1,7) = ROUND(A1(P1,7)/T5(A1(P1,2)+2),4)
16530 GOTO JMP5194
16540 JMP5193:A1(P1,3) = ROUND(A*A1(P1,3)/T5(1),4)
16550 A1(P1,6) = ROUND(A*A1(P1,6)/T5(2),4)
16560 A1(P1,4) = ROUND(A*A1(P1,4)/T5(A1(P1,1)+2),4)
16570 IF A1(P1,2)>0 THEN A1(P1,7) = ROUND(A*A1(P1,7)/T5(A1(P1,2)+2),4)
16580 JMP5194:NEXT P1
16590 RETURN
16600 JMP5150:A=S1(Y-1,1)/GO(Y-1,13)
16610 FOR Q1 = 3 TO 12 STEP 3
16620 GO(Y-1,Q1) = ROUND(GO(Y-1,Q1)*A,0)
16630 NEXT Q1
16640 FOR P1 = 1 TO 14
16650 IF P1=Y-1 THEN JMP5151
16660 A1(P1,3) = ROUND(A1(P1,3)/(1+(A-1)*A1(Y-1,3)),4)
16670 A1(P1,6) = ROUND(A1(P1,6)/(1+(A-1)*A1(Y-1,6)),4)
16680 IF A1(P1,1)<>A1(Y-1,1) THEN JMP5160
```

```
16690 A1(P1,4) = ROUND(A1(P1,4)/(1+(A-1)*A1(Y-1,4)),4)
16700 JMP5161:IF A1(P1,2)<>A1(Y-1,2) THEN JMP5162
16710 A1(P1,7) = ROUND(A1(P1,7)/(1+(A-1)*A1(Y-1,7)),4)
16720 JMP5162:IF A1(Y-1,5)=0 THEN JMP5163
16730 A1(P1,5) = ROUND(A1(P1,5)/(1+(A-1)*A1(Y-1,5)),4)
16740 A1(P1,8) = ROUND(A1(P1,8)/(1+(A-1)*A1(Y-1,8)),4)
16750 JMP5163:GOTO JMP5152
16760 JMP5151:FOR Q1 = 3 TO 8
16770 A1(P1,Q1) = ROUND(A1(P1,Q1)*A/(1+(A-1)*A1(P1,Q1)),4)
16780 NEXT Q1
16790 JMP5152:NEXT P1
16800 RETURN
```

```
16820 ***************************************************************
16830 *                                                             *
16840 *     #53 - THIS SUBROUTINE COMPUTES THE ENTRIES FOR          *
16850 *           LOS CELLS IN INVTO RESULTING FROM IO              *
16860 *           ACCESSIONS                                        *
16870 *           NOTE: RO(T3) IS THE RATIO OF THE NUMBER           *
16880 *                 AT THE END OF YEAR T3 TO THAT AT THE        *
16890 *                 END OF YEAR T3-1.  RO(1)=YR1/ACC.  THE      *
16900 *                 INVENTORY IN YEAR T3 IS THE AREA UNDER      *
16910 *                 THE DISTRIBUTION CURVE IN THE YEAR T3.      *
16920 *                                                             *
16930 ***************************************************************
16940 DEFFN' 53(IO)
16950 H = IO
16960 FOR P = 1 TO 30
16970 INVTO(P) = H*(1+RO(P))/2
16980 H = H*RO(P)
16990 NEXT P
17000 INVTO(31) = IO
17010 MAT INVT = ZER:Q76 = 0
17020 FOR P = 1 TO 31
17030 INVT(8,P) = INVTO(P)
17040 NEXT P
17050 FOR P = 2 TO 30
17060 Q76 = Q76 + INVT(8,P-1) - INVT(8,P)
17070 NEXT P
17080 RETURN
```

```
17100 ***************************************************************
17110 *                                                             *
17120 *      #55 - THIS SUBROUTINE ACCEPTS START TIME (T1),         *
17130 *             TOUR LENGTH (T2), START FLOW (I0),              *
17140 *             DESTINATION ACTIVITY (A), AND TOUR NUMBER       *
17150 *             (B).  IT PRODUCES THE VALUE OF THE              *
17160 *             DESTINATION REQUIREMENT MET (C) AND OF THE      *
17170 *             DESTINATION REQUIREMENT INCREMENT + TRANSIENT   *
17180 *             REQUIREMENTS (C2).  THE DISTRIBUTION OF C2 BY   *
17190 *             YEAR IS GIVEN IN T8( ).                         *
17200 *                                                             *
17210 ***************************************************************
17220 DEFFN' 55(T1,T2,I0,A,B)
17230 C,C2,I2 = 0
17240 IF I0 = 0 THEN RETURN
17250 MAT T8 = ZER
17260 L = 1
17270 T1 = ROUND(T1,0):T2 = ROUND(T2,0)
17280 T10 = T1/12 : T3 = INT(T10+1)
17290 /* COMPUTE TRANSIENT TIME */
17300 T4 = 1
17310 IF A = 1 AND B < 3 THEN T4 = 7
17320 IF A = 1 AND B > 2 THEN T4 = 5
17330 /* COMPUTE C2 */
17340 T20 = (T2+T4)/12
17350 K1 = (T3-T10) * (1-R0(T3))
17360 H = I0 * (1-K1)
17370 T8(L+1) = ((I0+H)/2) * (T3-T10)
17380 C2 = C2+T8(L+1)
17390 T20 = T20-(T3-T10)
17400 IF T20 <= 0 THEN JMP23                /* SHORT FIRST ENTRY */
17410 JMP21 : L = L+1 : T3 = T3+1
17420 IF T20 <= 1 THEN JMP22                 /* GO TO LAST ENTRY */
17430 T8(L+1) = H * (1+R0(T3))/2
17440 H = H * R0(T3)
17450 C2 = C2 + T8(L+1)
17460 T20 = T20-1
17470 GO TO JMP21
17480 JMP22 : K1 = T20 * (1-R0(T3))         /* CREATE LAST ENTRY */
17490 T8(L+1) = H * ((2-K1)/2) * T20
17500 C2 = C2 + T8(L+1)
17510 T8(1) = L
17520 I2 = H * (1-K1)
17530 GO TO JMP24
17540 JMP23 : T20 = T20 - (T3-T10)           /* SHORT FIRST ENTRY */
17550 K1 = K1 * (1-T20)/(T3-T10)
17560 T8(L+1) = T8(L+1) - (H*(2-K1)/(2*(1-K1)))*((T3-T10)-T20)
17570 C2 = T8(L+1)
17580 I2 = H/(1-K1)
```

```
17590 JMP24 : /* COMPUTE C */
17600 T3 = INT(T10+1)
17610 IF T4/12 > (T3-T10) THEN JMP25
17620 K1 = (T4/12) * (1-RO(T3))
17630 C = (IO * (2-K1)/2) * (T4/12)
17640 GO TO JMP26
17650 JMP25 : C = T8(2)
17660 K1 = (T3-T10) * (1-RO(T3))
17670 H = IO * (1-K1)
17680 T4 = (T4/12) -(T3-T10)
17690 T3 = T3+1
17700 K1 = T4 * (1-RO(T3))
17710 C = C+(H*(2-K1)/2) * T4
17720 JMP26 :  C = C2 -C
17730 RETURN
```

```
17750 ************************************************************************
17760 *                                                                      *
17770 *        #60 - THIS SUBROUTINE CALCULATES THE CORRECT FLOW             *
17780 *              TO PROFESSIONAL EDUCATION (ACTIVITY 6).                 *
17790 *              NEEDS START TIME (T1), TOUR LENGTH (T2),                *
17800 *              INPUT FLOW (P1), TOUR NUMBER (J) AND SOURCE             *
17810 *              ACTIVITY (N). OUTPUTS ARE IDENTICAL TO                  *
17820 *              SUBROUTINE #55/#61.                                     *
17830 *                                                                      *
17840 ************************************************************************
17850 DEFFN' 60(T1,T2,P1,J,N)
17860 C,C2,I2 = 0
17870 IF P1 = 0 THEN RETURN
17880 IF DO(6,S10) <= 0 THEN DLT = P1 ELSE JMP704
17890 GOTO JMP713
17900 JMP704:GOSUB' 55(T1,T2,P1,6,J)
17910 GOSUB' 61(T1,P1,6,J,S10)
17920 /* C,C2,I2,Q8,T8() SCALED;L,DLT AVAILABLE*/
17930 IF Q8 = 0 THEN DLT = P1 ELSE JMP711
17940 GOTO JMP713
17950 JMP711:T3 = T1/12:T20 = (T2+1)/12:L1 = 1
17960 MAT T17 = T8
17970 MAT T8 = ZER
17980 IF T20 < 1 THEN JMP706
17990 T8(1) = (INT(T3+1)-T3)*I2
18000 T20 = T20 - (INT(T3+1)-T3)
18010 JMP705:L1 = L1 + 1
18020 IF T20 < 1 THEN JMP706
18030 T8(L1) = I2
18040 T20 = T20 - 1
18050 GOTO JMP705
18060 JMP706:T8(L1) = T20*I2
18070 FOR R = 1 TO L
18080 T17(R) = T17(R) - T8(R)
18090 INVT(6,INT(T3+R)) = INVT(6,INT(T3+R)) + T8(R)
18100 INVT(8,INT(T3+R)) = INVT(8,INT(T3+R)) - T8(R)
18110 T8(R) = T17(R)
18120 NEXT R
18130 K4 = C:K5 = C2
18140 C2 = I2*(T2+1)/12:C = I2*T2/12
18150 K4 = K4 - C:K5 = K5 - C2
18160 IF K4<=0 THEN DLT=P1 ELSE JMP710
18170 GOTO JMP713
18180 JMP710:Q6 = 0:Q8 = 0
18190 IF DO(2,S10)+DO(3,S10) <= 0 THEN JMP707
18200 IF (DO(2,S10)<=0 OR STR(T9$(2,J),3*N,3)="NNN") THEN JMP708
18210 Q6 = 1/6
18220 IF DO(2,S10)<K4*Q6 THEN Q6 = (DO(2,S10)/(K4*Q6))*Q6
18230 FOR R = 1 TO L
```

```
18240 INVT(2,INT(T3+R)) = INVT(2,INT(T3+R)) + T17(R)*Q6
18250 T8(R) = T8(R)-T17(R)*Q6
18260 NEXT R
18270 CONVERT STR(T9$(2,J),3*N,3) TO D2
18280 D2 = D2 + K5*Q6
18290 CONVERT INT(D2+.5) TO STR(T9$(2,J),3*N,3),PIC(###)
18300 DO(2,S10) = DO(2,S10) - K4*Q6
18310 JMP708:
18320 IF (DO(3,S10) <= 0 OR STR(T9$(3,J),3*N,3) = "NNN") THEN JMP707
18330 Q8 = 1/2 - Q6
18340 IF DO(3,S10) < K4*Q8 THEN Q8 = (DO(3,S10)/(K4*Q8))*Q8
18350 FOR R = 1 TO L
18360 INVT(3,INT(T3+R)) = INVT(3,INT(T3+R)) + T17(R)*Q8
18370 T8(R) = T8(R)-T17(R)*Q6
18380 NEXT R
18390 CONVERT STR(T9$(3,J),3*N,3) TO D2
18400 D2 = D2 + K5*Q8
18410 CONVERT INT(D2+.5) TO STR(T9$(3,J),3*N,3),PIC(###)
18420 DO(3,S10) = DO(3,S10) - K4*Q8
18430 JMP707:K3 = K4 - K4*(Q6+Q8)
18440 Q6 = 1 - Q6 - Q8
18450 IF (DO(7,S10)<=0 OR STR(T9$(7,J),3*N,3)="NNN") THEN JMP709
18460 IF DO(7,S10)<K4*Q6 THEN Q6 = (DO(7,S10)/(K4*Q6))*Q6
18470 FOR R = 1 TO L
18480 INVT(7,INT(T3+R)) = INVT(7,INT(T3+R)) + T17(R)*Q6
18490 T8(R) = T8(R)-T17(R)*Q6
18500 INVT(8,INT(T3+R)) = INVT(8,INT(T3+R)) - T17(R)+T8(R)
18510 NEXT R
18520 CONVERT STR(T9$(7,J),3*N,3) TO D2
18530 D2 = D2 + K5*Q6
18540 CONVERT INT(D2+.5) TO STR(T9$(7,J),3*N,3),PIC(###)
18550 DO(7,S10) = DO(7,S10) - K4*Q6
18560 K3 = K4 - K4*Q6 - K3
18570 JMP709:OUTA(J) = OUTA(J) + K3*(K5/K4)
18580 FOR R = 1 TO L
18590 IF INVT(8,INT(T3+R))<0 THEN JMP6010
18600 IF INVT(8,INT(T3+R))<T8(R) THEN OUTA(J) = OUTA(J)-(T8(R)-
18610   INVT(8,INT(T3+R)))
18620 IF INVT(8,INT(T3+R))<T8(R) THEN T8(R) = INVT(8,INT(T3+R))
18630 INVT(8,INT(T3+R))=ROUND(INVT(8,INT(T3+R))-T8(R),0)
18640 INVT(9,INT(T3+R))=ROUND(INVT(9,INT(T3+R))+T8(R),0)
18650 GOTO JMP6011
18660 JMP6010:INVT(8,INT(T3+R))=0
18670 OUTA(J) = OUTA(J) - T8(R)
18680 JMP6011:NEXT R
18690 OUTA(J) = ROUND(OUTA(J),4)
18700 RETURN
18710 JMP713:C = 0:I2 = 0:C2 = 0
18720 RETURN
```

```
18740 ************************************************************************
18750 *                                                                      *
18760 *       #61 - THIS SUBROUTINE CHECKS INPUT AGAINST                     *
18770 *             REQUIREMENTS DO( ) AND INVENTORY INVT( ),                *
18780 *             AND ADJUSTS TO STAY WITHIN LIMITS.  NEEDS                *
18790 *             START TIME (T1), INPUT(IO), DESTINATION                  *
18800 *             (I), DESTINATION TOUR NUMBER (J) AND                     *
18810 *             REQUIREMENTS COLUMN INDEX (S100). T8( ), C,C2            *
18820 *             AND I2 ARE FROM SUBROUTINE #55.                          *
18830 *                                                                      *
18840 ************************************************************************
18850 DEFFN' 61(T1,IO,I,J,S100)
18860 IF IO = 0 THEN RETURN
18870 L = T8(1)
18880 Q6 = 1
18890 Q8 = IO
18900 FOR R = 1 TO L
18910 T8(R) = T8(R+1)
18920 NEXT R
18930 T8(L+1) = 0
18940 IF I = 9 THEN JMP755
18950 IF J<3 AND I = 6 THEN C5 = I2*(T2/12) ELSE C5 = C
18960 IF C5 <= DO(I,S100) THEN JMP755
18970 Q6 = DO(I,S100)/C5
18980 FOR R = 1 TO L
18990 T8(R) = Q6*T8(R)
19000 NEXT R
19010 C = C*Q6
19020 C2 = C2*Q6
19030 I2 = I2*Q6
19040 Q8 = Q8*Q6
19050 I6 = IO*Q6
19060 JMP755:Q6 = 1:Q45 = 0:Q46 = 0:MAT T22 = ZER
19070 IF J<3 AND I=6 THEN JMP766
19080 FOR R = 1 TO L
19090 IF T8(R) = 0 THEN JMP753
19100 IF T8(R) <= INT(INVT(8,INT(T1/12)+R)+1) THEN JMP753
19110 FOR P = 1 TO L
19120 IF INVT(8,INT(T1/12)+P)<0 THEN INVT(8,INT(T1/12)+P)=0
19130 Q45 = Q45 + INVT(8,INT(T1/12)+P)
19140 Q46 = Q46 + T8(P)
19150 IF INVT(8,INT(T1/12)+P)>=T8(P) THEN JMP761
19160 T22(P) = T8(P) - INVT(8,INT(T1/12)+P)
19170 INVT(I,INT(T1/12)+P)=INVT(I,INT(T1/12)+P)+INVT(8,INT(T1/12)+P)
19180 INVT(8,INT(T1/12)+P) = 0
19190 GOTO JMP762
19200 JMP761:INVT(I,INT(T1/12)+P)=INVT(I,INT(T1/12)+P)+T8(P)
19210 INVT(8,INT(T1/12)+P)=INVT(8,INT(T1/12)+P)-T8(P)
19220 JMP762:IF INVT(8,INT(T1/12)+P)<0 THEN INVT(8,INT(T1/12)+P)=0
```

```
19230 NEXT P
19240 FOR P = 1 TO L
19250 IF T22(P)<=0 THEN JMP763
19260 FOR Q = 1 TO L
19270 IF INVT(8,INT(T1/12)+Q)<=0 THEN JMP764
19280 IF T22(P)<=INVT(8,INT(T1/12)+Q) THEN JMP765
19290 INVT(I,INT(T1/12)+Q)=INVT(I,INT(T1/12)+Q)+INVT(8,INT(T1/12)+Q)
19300 T22(P)=T22(P) - INVT(8,INT(T1/12)+Q)
19310 INVT(8,INT(T1/12)+Q)=0
19320 GOTO JMP764
19330 JMP765:INVT(I,INT(T1/12)+Q)=INVT(I,INT(T1/12)+Q)+T22(P)
19340 INVT(8,INT(T1/12)+Q)=INVT(8,INT(T1/12)+Q)-T22(P)
19350 T22(P)=0
19360 GOTO JMP763
19370 JMP764:NEXT Q
19380 JMP763:NEXT P
19390 IF Q45<Q46 THEN Q6=Q45/Q46
19400 GOTO JMP766
19410 JMP753:NEXT R
19420 FOR P = 1 TO L
19430 INVT(I,INT(T1/12)+P)=INVT(I,INT(T1/12)+P)+T8(P)
19440 INVT(8,INT(T1/12)+P)=INVT(8,INT(T1/12)+P)-T8(P)
19450 NEXT P
19460 JMP766:C = ROUND(C*Q6,4)
19470 C2 = ROUND(C2*Q6,4)
19480 I2 = ROUND(I2*Q6,4)
19490 Q8 = ROUND(Q8*Q6,4)
19500 DLT =ROUND(I0-Q8,4)
19510 I6 = I0*Q6
19520 FOR P = 1 TO L
19530 INVT(I,INT(T1/12)+P)=ROUND(INVT(I,INT(T1/12)+P),4)
19540 INVT(8,INT(T1/12)+P)=ROUND(INVT(8,INT(T1/12)+P),4)
19550 IF INVT(8,INT(T1/12)+P)<0 THEN INVT(8,INT(T1/12)+P)=0
19560 NEXT P
19570 IF I>2 THEN JMP6120
19580 IF I=1 AND N<>2 THEN JMP6120
19590 Q74 = Q74+I6
19600 JMP6120:RETURN
```

```
19620 ******************************************************************
19630 *                                                                *
19640 *     #63 - THIS SUBROUTINE IS USED TO CLEAR THE SCREEN          *
19650 *           AND RESET FOR PERIODS WHEN THE PROGRAM IS            *
19660 *           RUNNING.                                             *
19670 *                                                                *
19680 ******************************************************************
19690 DEFFN' 63
19700 INIT(HEX(20))P1$(1)
19710 P5 = LEN(A$):P6 = LEN(TYPE$(Q11))
19720 STR(TO$,1,2) = STR(TIME,1,2)
19730 STR(TO$,3,1) = ":"
19740 STR(TO$,4,2) = STR(TIME,3,2)
19750 STR(TO$,6,1) = ":"
19760 STR(TO$,7,2) = STR(TIME,5,2)
19770 INIT(HEX(20))B$
19780 STR(P1$(1),1,P5) = A$
19790 STR(P1$(1),P5+2,2) = "IN"
19800 STR(P1$(1),P5+5,P6) = TYPE$(Q11)
19810 STR(P1$(1),P5+P6+6,9) = "COMMUNITY"
19820 DISPLAY AT(10,30),"EXECUTION CONTINUES",
19830         AT(12,35),"WORKING ON",
19840         AT(14,20),P1$(1),CH(60),
19850         AT(21,50),"MAIN ITERATION",AT(21,69),T50,PIC(##),
19860         AT(22,10),TO$,CH(9),
19870         AT(22,50),"'OTHER' ITERATION",AT(22,69),T51,PIC(##)
19880 RETURN
```

```
19900 ******************************************************************
19910 *                                                                *
19920 *        #66 - THIS SUBROUTINE IMPLEMENTS UPWARD DETAILING       *
19930 *              WHEN LOWER GRADE REQUIREMENTS ARE ALL MET.        *
19940 *              REQUIRES TOUR START TIME (T1), SOURCE NODE        *
19950 *              (N), TOUR NUMBER (J) AND CURRENT REQUIREMENT      *
19960 *              INDEX (S11), SOURCE FLOW IS IN T6(8).  FLOWS      *
19970 *              ARE PLACED IN CURRENT TOUR. REQUIREMENTS ARE      *
19980 *              REDUCED IN NEXT HIGHER REQUIREMENT.  C,C2         *
19990 *              AND I2 ARE HANDLED INTERNALLY.  T6(8) IS          *
20000 *              RESET EQUAL TO DLT ON EXIT.  Q37( ) CONTAINS      *
20010 *              NUMBER (C2) DETAILED UPWARD.                      *
20020 *
20030 ******************************************************************
20040 DEFFN' 66(T1,N,J,S11)
20050 IF S11<4 THEN S12=S11+1 ELSE S12=3
20060 MAT T5 = ZER
20070 T5(1) = T6(8)
20080 IF Q37(8,S12)>=DAT*D8(S12) THEN RETURN
20090 C3 = DAT*D8(S12)-Q37(8,S12)
20100 IF S11=1 AND J<3 THEN RETURN
20110 IF S11=2 AND J<5 THEN RETURN
20120 Q3=0
20130 FOR R1=1 TO 7
20140 IF C3<=0 THEN JMP3064
20150 TD = 1
20160 IF R1 = 1 AND J < 3 THEN TD = 7
20170 IF R1 = 1 AND J > 2 THEN TD = 5
20180 CONVERT STR(T9$(R1,J),1,2) TO T2
20190 IF J=7 THEN T2=311-Q7(N,J-1)
20200 IF T5(R1) <= 0.0 THEN JMP3064
20210 IF DO(R1,S12) <= 0 THEN JMP3064
20220 IF S1(Q11,1)=0 THEN JMP3063
20230 Q3 = 3
20240 IF A1(Q11,2)>0 THEN Q3 = 2
20250 IF S12=2 AND R1=1 AND DO(1,S12)/S1(Q11,1)<Q3 THEN JMP3064
20260 JMP3063:
20270 IF STR(T9$(R1,J),3*N,3)="NNN" THEN JMP3064  /*BARRED TRANSITIONS*/
20280 IF S11=2 AND R1<4 THEN JMP3064 /*NO UPWARD DETAILING TO COMMANDS*/
20290 IF R1=6 AND S11=1 THEN JMP3064  /*NO PC TO WAR COLLEGE DETAILING*/
20300 IF S11 = 3 AND (R1=2 OR R1=5) THEN JMP3064 /*DOD COMMAND BILLETS*/
20310 IF S11=4 AND R1=1 THEN JMP3064      /*SR CDR FRS AND AE DAT*/
20320 JMP6603:GOSUB' 55(T1,T2,T5(R1),R1,J)
20330 IF C<=C3 THEN JMP6602
20340 IF S11>2 THEN JMP6602
20350 Q6=C3/C
20360 T5(R1+1) = T5(R1+1) + (1-Q6)*T5(R1)
20370 T5(R1) = Q6*T5(R1)
20380 GOTO JMP6603
```

```
20390 JMP6602:GOSUB' 61(T1,T5(R1),R1,J,S12)
20400 D0(R1,S12)=ROUND((D0(R1,S12)-C),4)
20410 C3 = C3 - C
20420 I4(R1,J) = I4(R1,J) + ROUND(I2,4)
20430 I40(N,R1) = I40(N,R1) + Q8*T1
20440 I42(N,R1)= I42(N,R1) + Q8
20450 IF S11 > 2 THEN JMP6601
20460 Q37(R1,S12)=Q37(R1,S12)+C:Q37(8,S12)=Q37(8,S12)+C
20470 CONVERT STR(T9$(R1,J),24,3) TO D2
20480 CONVERT (D2+INT(C2+.5))TO STR(T9$(R1,J),24,3),PIC(###)
20490 JMP6601:T5(R1+1)=T5(R1+1)+DLT
20500 GOTO JMP3065
20510 JMP3064:T5(R1+1)=T5(R1+1)+T5(R1)
20520 JMP3065:NEXT R1
20530 T6(8)=T5(8)
20540 RETURN
```

```
20560 ****************************************************************************************
20570 *                                                                                      *
20580 *     #67 - THIS SUBROUTINE RESETS ALL VARIABLES AND                                   *
20590 *           VARIABLE ARRAYS IN PREPARATION FOR A NEW                                   *
20600 *           ITERATION.                                                                 *
20610 *                                                                                      *
20620 ****************************************************************************************
20630 DEFFN' 67
20640 MAT D8 = ZER
20650 FOR P = 1 TO 7
20660 FOR Q = 1 TO 4
20670 D0(P,Q) = Q4(P,Q)
20680 NEXT Q
20690 NEXT P
20700 MAT Q37  = ZER
20710 FOR P = 1 TO 8
20720 OUTA(P) = 0
20730 NEXT P
20740 FOR Q = 1 TO 7
20750 FOR P = 1 TO 7
20760 I4(P,Q) = 0
20770 Q7(P,Q) = 0
20780 I40(P,Q) = 0
20790 FOR K = 1 TO 7
20800 IF STR(T9$(P,Q),3*K,3) = "NNN" THEN JMP899
20810 STR(T9$(P,Q),3*K,3) = "000"
20820 JMP899:NEXT K
20830 STR(T9$(P,Q),24,3) = "000"
20840 NEXT P
20850 NEXT Q
20860 Q74 = 0
20870 FOR P = 1 TO 20
20880 T5(P),T6(P),T7(P),T8(P),T15(P),T17(P),T18(P) = 0
20890 NEXT P
20900 RETURN
```

```
20920 RETURN
20930 ************************************************************
20940 *                                                          *
20950 *     #85 - THIS SUBROUTINE IS USED TO DELETE THE          *
20960 *           WORKING FILES 'CAREER' AND 'SOURCE' TO         *
20970 *           RESET THE MODEL FOR GROUP SPECIFICATION        *
20980 *           WHEN USER SO REQUESTS.                         *
20990 *                                                          *
21000 ************************************************************
21010 DEFFN' 85
21020 OPEN NODISPLAY #1,ID,FILE = "SOURCE",LIBRARY = "OFFREQ",
21030 VOLUME = "VOL555"
21040 OPEN NODISPLAY #2,ID,FILE = "CAREER",LIBRARY = "OFFREQ",
21050 VOLUME = "VOL555"
21060 FOR K = 1 TO 30
21070 READ #1,HOLD,EOD GOTO JMP8501
21080 DELETE #1
21090 JMP8501:READ #2,HOLD,EOD GOTO JMP8502
21100 DELETE #2
21110 NEXT K
21120 JMP8502:CLOSE #1
21130 CLOSE #2
21140 RETURN
```

```
Basic Cross Reference

Float Variable     A
(Static)             5420   7800  10530  10540  10550  10560  10570  10580  10600  10600  10610  10620  16310  16350  16370  16450
                    16540  16550  16560  16570  16600  16620  16660  16670  16690  16710  16710  16740  16770  16770  17220  17310
                    17320

String Variable    A$ 20
(Common)              550   3480   3910   3910   3920   3930   4810   4820   4850   4920   4920   5160   5450   5520   5850   6380
                     6460   6670   6710   6740   7910   9530   9590  19710  19780

Float Array        A1(15,9)
(Common)              580   3100   5400   5410   5740   5760   5960   5970   5990   6000   6020   6040   6080   6700   6700   6710
                     6740   6760   9560   9560   9560   9570   9570   9570   9580   9580  10010  10010  10020  10020  10030  10030
                    10030  10030  10440  10460  10490  10610  10610  10620  10620  10680  11070  11130  15130  15130  15200  15200
                    15220  15230  15230  15230  16330  16390  16400  16410  16410  16410  16420  16420  16420  16420  16480  16490
                    16430  16500  16500  16510  16510  16510  16520  16520  16520  16520  16540  16540  16550  16550  16560  16560
                    16560  16570  16570  16570  16570  16660  16660  16660  16670  16670  16670  16680  16680  16690  16690  16690
                    16700  16700  16710  16710  16710  16720  16730  16730  16730  16740  16740  16740  16770  16770  16770  20240

String Variable    A2$ 10
(Static)             5400   5400   5650

String Variable    A3$ 10
(Static)             5390   5650

Float Array        A50(7)
(Static)              630   2770   2820  10190

Float Variable     ACC1
(Common)              530  15200  15230

Float Array        AUX(15,6)
(Static)              620   3100  10440  10460  10480

Float Variable     B
(Static)             7880   8120  10410  10410  10430  10640  10640  10680  17220  17310  17320

String Variable    D$ 70
(Common)              570  19770

Float Variable     B3
(Static)             2790   2810   2810   2840   2840  10160  10180  10180  10210  10210

String Variable    BGROUP$ 30
(Static)              650   8290   8630   9070   9170   9200   9210   9260   9260   9870

Float Variable     C
(Static)             7880   8120  11300  11420  11440  11460  11480  11500  11540  11560  11590  11710  11950  12020  12340  13780
                    17230  17630  17650  17710  17710  17720  17720  17860  18130  18140  18150  18710  18950  19010  19010  19460
                    19460  20330  20350  20400  20410  20460  20460

String Variable    C$ 70
(Common)              570  12150  12420  12430  13550  13560  13570  14520  14540  14550  14560  14640  14650  14660  14670  14680
                    14700  14710  14720  14730  14740  14750  14760  14770  14920  14930  14940  14950  14960  15720  15810  15970
```

```
Basic Cross Reference

Float Variable    C2
(Static)
                   11340  11600  11700  11900  12060  12110  12340  12350  12360  12830  14120  17220  17280  17380  17450  17450
                   17500  17500  17570  17660  17860  18130  18140  18150  18710  19060  19060  19470  19470  20480

Float Variable    C3
(Static)
                   20090  20140  20330  20350  20410  20410

Float Variable    C5
(Static)
                   10370  10930  11000  11000  18850  18850  18900  18920

String Variable   CDM$ 60
(Static)
                     650   5030   6070   6790   9330

String Variable   CDM1$ 30
(Static)
                     660   5390   5410   5450

Float Variable    D
(Static)
                    7880   8120

String Variable   D$ 8
(Common)
                     560

Float Array       DO(7,4)
(Common)
                     550  10390  10450  10470  10480  10490  10510  10520  10570  10580  10610  10620  10680  10890  10940  11130
                   11130  11150  11150  11160  11160  11170  11170  11180  11180  11230  11300  11300  11440  11450  11500  11500
                   11530  11590  11710  11710  11720  11720  11730  11730  11840  11950  11950  12340  13680  13780  13780  14440
                   14450  14850  15330  17880  18120  18120  18200  18220  18220  18300  18300  18320  18340  18340  18420  18420
                   18450  18460  18460  18550  18550  18600  18970  20210  20250  20400  20400  20470

Float Variable    D2
(Static)
                    3690   5420   5610   7860   7990   8120   9550  10000  10840  10940  10940  11080  11980  11990  13820  13830
                   14410  14450  14450  14480  14850  14850  14870  14940  18270  18280  18280  18290  18330  18400  18400  18410
                   18520  18530  18530  18540  20470  20480

Float Variable    D25
(Static)
                   14490  14570  14770  14880

Float Variable    D3
(Static)
                   11420  11440  11460  11480  11500  11540  11560

Float Array       D8(8)
(Common)
                     560  11210  11230  11230  11250  20080  20090  20640

Float Variable    D80
(Static)
                   11190  11220  11250  14890

Float Array       D9(4)
(Common)
                     560

Float Variable    DLT
(Static)
                   11070  11080  12000  13720  13760  17880  17930  18360  19500  20490

Float Variable    I
(Static)
                   10230  10250  10270  10290
```

Copy [illegible] DTIC does not
permit fully [illegible] reproduction

```
Basic Cross Reference

String Variable   E$ 130
(Common)              580  14790  14800  14810  14820  15090  15100  15110  15120  15130  15140  15150  15160  15170

String Variable   FM$ 40
(Static)              600   8270   8580  15160  15640

Float Array       FA1(5)
(Static)              640   3290  13750

Label             FILECAR
                     2630   9590  10060

Label             FILEFORM
                     2510   9530   9980

Float Array       GO(15,13)
(Static)              610   2380   5570   5580   5590   5730   5740   5740   5760   5770   5900   5910   5920   9540   9540   9550
                     9550   9550   9550  10000  10000  10000  10000  10010  10010  10430  10440  10450  10460  10470  10480  10490
                    10510  10520  10540  10550  10560  10570  10610  10650  10650  10680  10600  10620  10620

String Variable   G4$ 7
(Static)              640   4970   5430   5830   6100   6640   6870   7470   7830   8310   8650   8720   9030   9330   9380   9680

String Variable   G5$ 1
(Static)              640   9380   9390   9440   9900   9930

String Variable   GROUP$ 30
(Static)              650   8270   8440   8450   8460   8470   8480   8490   8500   8510   8520   8530   8540   8550   8560   8570
                     8630   8840   8850   8860   8880   8890   8900   8920   8930   8960   9070   9110   9110   9120   9130   9130
                     9140   9150   9170   9180   9200   9210   9240   9260   9270   9270   9340   9440   9850   9930

Float Variable    H
(Static)            16950  16970  16980  16980  17360  17370  17430  17440  17440  17490  17520  17560  17580  17670  17710

Float Variable    I
(Static)             2730   2740   2750   2760   2770   2780   2800   2810   2820   2840 [illegible] 2960   2980   3000   3020   3040
                     3060   3080   3100   3120   3140   3160   3180   3200   3220   3240 [illegible] 3270   3290   3300   3320   3340
                     3350   3360   3370   3510   3530   3540   3540   3550   3570   3580 [illegible] 3600   7440   7460   7550   7590
                     7640   7650   7670   7680   7700   7710   7730   7790   7810   7830  10110  10130  10170  10180  10190  10210
                    10220  10240  10250  10260  10280  10290  10300  10650  10660  10660  10660  10680  10700  10860  10870  10880
                    10890  10910  10930  10940  10950  11220  11230  11260  11350  11360 [illegible] 11360 11370  11370  11370  11380
                    11660  11660  11670  11670  11670  11680  11680  11680  11690  11690  11700  11820  11830  11840  11850  11860
                    11880  11890  11890  11900  11900  11930  11950  11950  11960  11960  11970  11980  11990  12000  12000  12030
                    12030  12030  12040  12050  12290  12300  12310  12340  12340  12340 [illegible] 12360 12370  12370  12380  12380
                    12390  12480  12500  12510  12520  12520  12530  12530  12540  12550  12560  12560  12570  12570  12580  12590
                    12810  12830  12830  12840  12840  12850  12860  12860  12890  13460  13470  13470  13470  13480  13660  13670
                    13680  13690  13700  13750  13760  13770  13780  13780  13790  13790  13800  13800  13810  13810  13820  13830
                    13860  13890  13960  13990  14000  14010  14030  14050  14060  14060  14090 [illegible] [illegible] 14100  14430  14440
                    14450  14460  15250  15260  15270  15270  15280  15320  15350  15370  15400  15420  15430  15500  15520  15530
                    15530  15530  15530  15530  15530  15530  15540 [illegible] [illegible] [illegible] [illegible] [illegible] 19120  19170  19170  19200
                    19200  19230  19230  19330  19330  19430  19430 [illegible] 19530  19570  19580

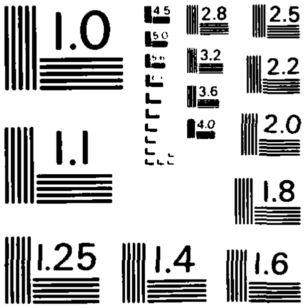
String Variable   I$ 2
(Static)              660   9960   9980  10060
```

AD-A134 293 AVIATION OFFICER REQUIREMENTS STUDY(U) INFORMATION
SPECTRUM INC ARLINGTON VA F E O'CONNOR 31 AUG 82
ISI-V-83-2693-02 N00014-81-C-0368

33

UNCLASSIFIED F/G 5/9 NL

END
DATE
FILMED
11 - 83
DTIC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4.5
5.0
2.8
2.5
3.2
2.2
3.6
4.0
2.0
1.1
1.8
1.25
1.4
1.6

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS-1963-A

```
Basic Cross-Reference

Float Variable    I0
(Static)           11080  11090  14480  14490  14500  14510  14510  14590  14870  14880  14890  14890  14900  14900  14970  16040
                   16950  17000  17220  17240  17360  17370  17640  17670  18850  18860  18890  19050  19500  19510

Float Variable    I1
(Static)           12860  12970  13030  13040  13040

Float Variable    I2
(Static)           11310  11410  11600  11740  11960  12020  12120  13790  14200  17230  17540  17580  17860  17930  18030  18060
                   18140  18140  18710  18950  19070  19070  19480  19480  20420

Float Variable    I3
(Static)           12740  12800  12810  13060  13140  13240

Float Variable    I4
(Static)            9860   9870   9880   9880   9880   9890   9900  15610

Float Array       I4(7,7)
(Common)             560  11310  11470  11530  11600  11650  11740  11810  11960  11960  12120  12120  12230  12330  12360  13490
                   13500  13510  13790  13790  14200  14200  15450  20420  20420  20760

Float Array       I40(7,7)
(Static)             640  12200  12350  12370  12380  12380  12510  12520  12520  12560  12560  12580  12760  12770  12770  12830
                   12840  12840  13330  13330  13380  13380  13620  13800  13800  13990  14000  16060  20430  20430  20780

Float Array       I41(7,7)
(Static)             610  12210  12570  12570  13030  13040  13040  13340  13340  13370  13370  13470  13470  13690  13750  16120

Float Array       I42(7,7)
(Static)             660  13430  13810  13810  14010  20440  20440

Float Variable    I5
(Static)            9910   9920   9930  15150  15590  15600

Float Variable    I6
(Static)           19050  19510  19590

Float Variable    IIN
(Static)           13750  13760  13770

Float Array       INVT(3,31)
(Common)             550  11360  11360  11370  11370  11670  11670  11680  11680  11690  11690  15190  15220  15290  15320  15350
                   15420  17010  17030  17060  17060  18090  18090  18100  18100  18240  18240  18360  18360  18480  18480  18500
                   18500  18590  18600  18610  18620  18620  18630  18630  18640  18640  18660  19100  19120  19120  19130  19150
                   19160  19170  19170  19170  19180  19200  19200  19210  19210  19220  19220  19270  19280  19290  19290  19290
                   19300  19310  19330  19330  19340  19340  19430  19430  19440  19440  19530  19530  19540  19540  19550  19550

Float Array       INVT0(31)
(Static)             610  11130  11150  11160  11170  11180  11290  11430  11490  11550  11570  11580  14510  14900  15410  16970
                   17000  17030

Float Variable    J
(Static)            2810   2820   2830   2970   2980   2990   3030   3040   3050   3090   3100   3110   3150   3160   3170   3210
                    3220   3230   3310   3320   3330   3520   3530   3540   3540   3550   3560   7450   7460   7560   7590   7640
                    7650   7670   7680   7700   7710   7730   7800   7810   7820  10120  10130  10180  10190  10200  10670  10830
```

```
Basic Cross-Reference

                        10680  10690  10880  10890  10890  10900  10920  10940  10960  10980  10990  11000  11010  11030  11040  11050
                        11060  11200  11210  11230  11230  11230  11250  11260  12190  12230  12290  12300  12310  12320  12320  12330
                        12300  12300  12370  12430  13490  13500  13500  13510  13570  13650  13670  13700  13710  13710  13760  13770
                        13790  13790  13820  13830  13920  14030  14050  14060  14060  14080  14090  14090  14140  14150  14160  14160
                        14170  14180  14190  14190  14200  14200  14250  14280  14420  14440  14450  14470  14840  14850  14860  15280
                        15290  15300  15310  15320  15330  15340  15350  15360  15470  15490  15490  15510  17850  17900  17910  18200
                        18270  18290  18320  18390  18410  18450  18520  18540  18570  18570  18600  18610  18670  18670  18690  18690
                        18850  18950  19070  20040  20100  20110  20160  20170  20180  20190  20190  20270  20320  20390  20420  20420
                        20470  20480

Label                   JMP100
                         3690  12890  15650

Label                   JMP105
                         2710   4080

Label                   JMP106
                          750   2710

Label                   JMP110
                         3710   4430   4440   4720   4730   5300   8660   8680   9040   9060

Label                   JMP1120
                        11110  14620  15010

Label                   JMP1141
                        11460  11500

Label                   JMP1142
                        11440  11520  11560

Label                   JMP1143
                        11450  11510  11560  11570

Label                   JMP1200
                        11840  11850  11860  12020

Label                   JMP1210
                        11880  11920

Label                   JMP1220
                        11910  11940

Label                   JMP1230
                        12010  12050

Label                   JMP1250
                        12070  12130

Label                   JMP1350
                        12140  12170

Label                   JMP1351
                        12340  13130  13180
```

Basic Cross Reference

```
Label               JMP1352
                     13190   13200   13260

Label               JMP1353
                     13000   13120

Label               JMP1354
                     12800   12940

Label               JMP1358
                     12880   13070

Label               JMP1359
                     12870   12900

Label               JMP1360
                     12290   12300   12370

Label               JMP1361
                     12680   13270   13420

Label               JMP1362
                     12760   13090   13170   13250

Label               JMP1363
                     12630   13350

Label               JMP1364
                     12820   12830   12920

Label               JMP1365
                     12790   13280

Label               JMP1366
                     12910   12930

Label               JMP1367
                     12760   12800

Label               JMP1368
                     13020   13030   13100

Label               JMP1370
                     13670   13680   13690   13860

Label               JMP1371
                     12430   12600

Label               JMP1372
                     12500   12510   12520

Label               JMP1373
                     12330   13410

Label               JMP1375
```

```
Basic Cross-Reference

                        14040   14080

Label                  JMP1396
                        14070   14100

Label                  JMP140
                         4100    4480

Label                  JMP1400
                        13880   13890   13900   13940

Label                  JMP1401
                        13990   14020

Label                  JMP1415
                        14130   14210

Label                  JMP1416
                        14220   14270

Label                  JMP1460
                        14440   14460

Label                  JMP1470
                        14530   14590

Label                  JMP1480
                        14500   14690

Label                  JMP1485
                        14690   14780

Label                  JMP1490
                        14780   14830

Label                  JMP150
                         4740    4770

Label                  JMP1500
                        14910   14970

Label                  JMP160
                         4740    4740    4740    4790

Label                  JMP1600
                        14830   15030

Label                  JMP1603
                        15260   15370

Label                  JMP1610
                        15180   15220

Label                  JMP1611
                        15210   15240
```

```
Basic Cross-Reference

Label                    JMP1630
                            9930    15600

Label                    JMP1640
                            9870     9890    15610

Label                    JMP1650
                           15580    15650

Label                    JMP170
                            4760     4780     4800

Label                    JMP180
                            4110     4470     4810     9470

Label                    JMP190
                            5130     5780     6110     6610     6830     7430     7850

Label                    JMP21
                           17410    17470

Label                    JMP210
                            5350     5360

Label                    JMP22
                           17420    17480

Label                    JMP220
                            4960     5120     5350     5370

Label                    JMP23
                           17400    17540

Label                    JMP230
                            5350     5380     5800

Label                    JMP24
                           17530    17590

Label                    JMP240
                            5350     5810     6130     6590

Label                    JMP245
                            6420     6600

Label                    JMP25
                           17610    17650

Label                    JMP250
                            5350     6140     6610     6620

Label                    JMP26
                           17640    17720
```

```
Basic Cross Reference

Label                  JMP260
                         5350    6630    6850

Label                  JMP270
                         7460    7780    7870

Label                  JMP280
                         5350    6860    7850    7860

Label                  JMP290
                         7860    7870    8170

Label                  JMP300
                         4090    8240    9150    9810

Label                  JMP3063
                        20220   20260

Label                  JMP3064
                        20140   20200   20210   20250   20270   20280   20290   20300   20310   20510

Label                  JMP3065
                        20500   20520

Label                  JMP310
                         8630    8670

Label                  JMP320
                         8640    8700

Label                  JMP330
                         9010    9050

Label                  JMP340
                         9020    9030

Label                  JMP350
                         9200    9230

Label                  JMP360
                         9180    9220    9300

Label                  JMP370
                         9080    9310

Label                  JMP380
                         8140    9480

Label                  JMP390
                         9440    9670

Label                  JMP400
                         9370    9820

Label                  JMP410
```

```
Basic Cross Reference

                          8130   10090   10150

Label                    JMP5150
                          16300   16600

Label                    JMP5151
                          16650   16760

Label                    JMP5152
                          16750   16790

Label                    JMP5161
                          16680   16700

Label                    JMP5162
                          16700   16720

Label                    JMP5163
                          16720   16750

Label                    JMP5192
                          16330   16430

Label                    JMP5193
                          16480   16540

Label                    JMP5194
                          16530   16580

Label                    JMP6010
                          18590   18660

Label                    JMP6011
                          18650   18680

Label                    JMP6120
                          19570   19580   19600

Label                    JMP6601
                          20450   20490

Label                    JMP6602
                          20330   20340   20780

Label                    JMP6603
                          20320   20380

Label                    JMP704
                          17880   17900

Label                    JMP705
                          18010   18050

Label                    JMP706
                          17980   18020   18060
```

```
Basic Cross Reference

Label                   JMP707
                         18190   18370   18470

Label                   JMP708
                         18200   18310

Label                   JMP709
                         18450   18570

Label                   JMP710
                         18160   18180

Label                   JMP711
                         17930   17950

Label                   JMP713
                         17890   17940   18170   18710

Label                   JMP753
                         19090   19100   19410

Label                   JMP755
                         18940   18960   19060

Label                   JMP761
                         19150   19200

Label                   JMP762
                         19190   19220

Label                   JMP763
                         19250   19360   19380

Label                   JMP764
                         19270   19320   19370

Label                   JMP765
                         19280   19330

Label                   JMP766
                         19070   19400   19460

Label                   JMP8501
                         21070   21090

Label                   JMP8502
                         21090   21120

Label                   JMP899
                         20800   20820

Label                   JMP9067
                         12410   12450
```

```
Basic Cross Reference

Label              JMP90GB
                    13540  13590

Float Variable     K
(Static)             3380   3390   3400   3410   3420   3430   3440   3450   3460   9190   9200   9230   9250   9260   9260   9270
                     9280  10100  10110  10120  10130  10140  13730  13740  13750  13850  15270  15270  15290  15290  15320  15320
                    15350  15350  20790  20800  20810  20820  21060  21110

Float Variable     K1
(Static)            12630  12650  12680  12720  12730  12730  12740  12750  12770  13210  13240  13240  13300  13300  13320  17350
                    17360  17480  17490  17520  17550  17550  17560  17560  17580  17620  17630  17660  17670  17700  17710

Float Variable     K2
(Static)            12630  12660  12680  12730  12730  12760  12770  12780  13310  13310

Float Variable     K3
(Static)            18430  18560  18560  18570

Float Variable     K4
(Static)            18130  18150  18150  18160  18220  18220  18300  18340  18340  18420  18430  18430  18450  18460  18550  18560
                    18560  18570

Float Variable     K5
(Static)            18130  18150  18150  18280  18400  18530  18570

Float Variable     KY
(Static)             4060   4070   4080   4090   4100   4110

Float Variable     L
(Static)            10850  10850  11070  11070  11120  11120  11130  11130  17260  17370  17380  17410  17410  17430  17450  17490
                    17500  17510  17560  17560  17570  18070  18230  18350  18470  18580  18870  18900  18930  18980  19080  19110
                    19240  19260  19420  19520

Float Variable     L1
(Static)             9100   9240   9290   9290  17950  18010  18010  18030  18060

Float Variable     L4
(Static)             9420   9610   9620   9630   9640   9640

Float Variable     L5
(Static)            12720  12780  12780  12860  12860  12870  12900  12900  12940  12950  12950  12960  12970  12980  13060  13060
                    13070  13080  13080  13120  13120  13130  13140  13150  13160  13360  13370

Float Variable     L6
(Static)             8250   8260   9800   9810  13320  13330  13330  13340  13340  13350  13360  13360  13370  13370  13370  13370
                    13380  13380  13380  13380  13390  13400  13400

String Array       LABEL$(3) 25
(Common)              550   3360   6370   7030   7090   7150   7210   7270   7330   7550   7630   7640   7660   7670   7690   7700
                     7720

Float Variable     M
(Static)             3470   4450   4460   4750   4770   4790   4800   4810   4820   4830   4840   9450   9460   9460   9460   9480
                     9490  10080  10400  10410  10560  10600  10640  10850  11120  15180  15190  15190  15200  15200  15220  15220
                    15230  15230  15240  15380
```

```
Basic Cross Reference


String Variable   M$ 2
(Static)             660   9480   9530   9590   9980  10060  10080

Float Variable    M5
(Static)            4420   4440   4450   4720   4730   4740   4750   4770   4790   8030   8040   8070   8080   9010   9020   9050
                    9060

String Variable   MGROUP$ 30
(Common)             590   9840   9880

Float Variable    N
(Static)           10660  10660  10680  12220  12230  12290  12300  12320  12330  12350  12360  12360  12370  12370  12380  12380
                   12380  12380  12400  12470  12490  12510  12520  12520  12520  12520  12540  12540  12560  12560  12570  12570
                   12580  12580  12600  12640  12650  12650  12660  12660  12670  13010  13020  13030  13040  13040  13050  13060
                   13060  13100  13180  13190  13200  13210  13220  13260  13450  13470  13470  13470  13490  13490  13500  13500
                   13510  13520  13640  13650  13670  13690  13710  13750  13800  13800  13810  13810  13820  13830  13840  13840
                   13900  13910  13910  13920  13930  13940  13980  13990  14000  14010  14020  14120  14130  14140  14160  14170
                   14180  14210  17850  18200  18270  18290  18320  18330  18410  18450  18520  18540  19580  20040  20130  20270
                   20430  20430  20440  20440

Float Array       NO(7)
(Static)             610   2740   2810   2840  10180  10210

Float Variable    N1
(Static)           12740  12760  12770  12770  12830  12840  12840  13000  13150  13240  13320  13330  13330  13340  13340  13390

Float Variable    N2
(Static)           12860  12860  13000  13010

String Array      NS$(7,7) 1
(Static)             640   3550   6980   6980   6990   7000   7000   7010   7020   7040   7040   7050   7060   7070   7070   7080
                    7100   7100   7110   7120   7130   7130   7140   7160   7160   7170   7180   7190   7190   7200   7220   7220
                    7230   7240   7250   7250   7260   7280   7280   7290   7300   7310   7310   7320   7340   7340   7350   7360
                    7370   7370   7380   7460

Float Variable    ND
(Static)            5710   5720   5790   6090   6100   6120   6810   6820   6840

Float Variable    OAT
(Static)            3690   5620   9550  10000  10330  10390  13890  20080  20090

Float Array       OTH(3,8)
(Static)             610   3320  10680

Float Array       OUTA(8)
(Common)             580  12110  12110  14190  14190  15440  18570  18570  18600  18610  18670  18670  18690  18690  20720

Float Variable    P
(Static)            9360   9370   9370   9380   9820  10400  10400  10430  10440  10440  10440  10450  10460  10460  10460  10470
                   10480  10480  10490  10490  10510  10520  10570  10610  10620  10680  16010  16030  16060  16090  16120  16160
                   16330  16330  16350  16350  16370  16370  16380  16380  16390  16400  16410  16410  16410  16420  16420  16420
                   16420  16430  16470  16480  16490  16490  16500  16500  16510  16510  16510  16520  16520  16520  16520  16540
                   16540  16550  16550  16560  16560  16560  16570  16570  16570  16570  16580  16640  16650  16660  16660  16670
                   16670  16680  16690  16690  16700  16710  16710  16730  16730  16740  16740  16770  16770  16770  16790  16900
```

```
Basic Cross-Reference

                    16970  16970  16980  16990  17020  17030  17030  17040  17050  17060  17060  17070  19110  19120  19120  19130
                    19140  19150  19150  19160  19160  19160  19170  19170  19170  19180  19200  19200  19200  19210  19210  19210
                    19220  19220  19230  19240  19250  19280  19300  19300  19330  19340  19350  19380  19420  19430  19430  19430
                    19440  19440  19440  19450  19520  19530  19530  19540  19540  19550  19550  19560  20050  20070  20070  20090
                    20710  20720  20730  20750  20760  20770  20780  20800  20810  20830  20840  20870  20880  20880  20880  20880
                    20880  20880  20880  20890

Float Array        PO(10)
(Common)              560   3270   6330   6350   6370   9570   9570   9570  10020  10020  10020  11070  11070  11150  11160  11170
                    11180  11290  11430  11490  11550  11570  11580

Float Variable     P1
(Static)            11050  11070  17850  17870  17880  17900  17910  17930  18160

String Array       P1$(9) 130
(Common)              570   4900   4910   4920   4930   4940   4950   5000   5030  19700  19780  19790  19800  19810  19840

Float Variable     P2
(Static)            11020  11040  11040  11050  11070

String Array       P2$(10) 30
(Static)              640   9410   9610   9620   9630   9700   9710   9720   9720   9730   9730   9740   9740   9750   9750

Float Variable     P5
(Common)              550   4850   4870   4890   5160   5160   5440   5450   5570   5840   5850   6170   6180   6650   6660  19710
                    19780  19790  19800  19810

Float Variable     P6
(Common)              550   4860   4880   4890   5440   5450   5450   5840   5850   5850   6170   6180   6180   6650   6660   6660
                    19710  19800  19810

Float Variable     P7
(Static)             4870   5000

Float Variable     P8
(Static)             4880   5030

Float Variable     P9
(Common)              570   4890

String Array       POSIT$(5) 64
(Static)              620   3450

Float Variable     PR
(Static)             6420   6590

String Variable    PRO2$ 65
(Static)              640   2910   2930   2930   2940   6260   6270   6430   6440   6450   6460   6470

Float Variable     PRO3
(Static)             2920   6280   6430   6460   6480   6480   6480   6490   6500   6500   6500   6510   6520   6520

Float Variable     PRO4
(Common)              530   2920   6490   6510   6520   6520   6580   9530  10060  12240  12250  12280  12310
```

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Basic Cross Reference

Float Variable    PRO5
(Common)             590   2920   6540   6560   6570   6580   6590   9590  10000  12250  12260  12260  12270  15310  15340

Float Variable    PRO6
(Static)            2920   6380   6440   6470   6530   6530   6530   6540   6550   6550   6550   6560   6570   6570

Label             PRICAR15
                   16030  16060  16090  16120  16150

Float Array       PTR(14)
(Common)             600   3700  15190  15190  15200  15200  15220  15220  15230  15230

Float Variable    Q
(Static)            8690   9080   9160   9170   9170   9180   9200   9210   9210   9240   9250   9260   9270   9300   9430   9440
                    9450   9600   9670  10050  10060  10070  10110  10120  10130  10340  10350  10350  10360  10440  10450  10450
                   10460  10610  10620  10620  10630  10700  10770  10770  10770  10780  19260  19270  19280  19290  19290  19290
                   19300  19310  19330  19330  19340  19340  19370  20060  20070  20070  20080  20760  20760  20770  20780  20800
                   20810  20830  20850

Float Variable    Q11
(Common)             550   3470   3920   3930   4400   4800   4800   4940   4940   4950   5170   5400   5410   5440   5470   5490
                    5510   5530   5570   5580   5590   5740   5740   5740   5750   5760   5760   5760   5760   5840   5900   5910
                    5920   5930   5970   5990   6000   6020   6040   6170   6650   6680   6700   6700   6710   6740   6760   7920
                    7930   9400   9400   9530   9530   9540   9540   9540   9540   9540   9550   9550   9550   9550   9550   9560
                    9560   9560   9570   9570   9570   9580   9590   9610   9880   9900   9930   9930   9930   9930  10000  10000
                   10000  10000  10010  10010  10010  10010  10020  10020  10030  10030  10030  10030  10430  10430  10430  10430
                   10430  10440  10440  10440  10440  10460  10460  10460  10480  10480  10480  10490  10510  10520  10540
                   10550  10560  10570  10610  10610  10620  10620  10680  11070  11130  19710  19800  20720  20740  20750

Float Variable    Q12
(Static)            7780   7780   7790   7800   7810   9350   9500  10000  10030  10100

Float Variable    Q3
(Static)           13970  14010  14010  14040  14050  20120  20230  20240  20250

Float Array       Q37(8,4)
(Common)             580  15430  20080  20090  20400  20400  20400  20400  20700

Float Array       Q38(7)
(Static)             620  10870

Float Array       Q4(7,4)
(Static)             620  10890  15400  20670

Float Variable    Q45
(Static)           13440  13500  13500  13530  19000  19130  19130  19330  19330

Float Variable    Q46
(Static)           13440  13510  13510  13530  19000  19140  19140  19330  19330

Float Variable    Q5
(Static)           12520  12520  12530  12530  12540  12550  12560  12570  12730  12730  12770  12770  12790  12940  12940  12960
                   12980  13040  13040  13060  13100  13100  13110  13130  13140  13170  13180  13220  14000  14000  14050

Float Variable    Q6
```

Basic Cross-Reference

```
(Static)             18180  18210  18220  18220  18230  18230  18240  18250  18280  18300  18330  18370  18430  18440  18440  18460
                     18460  18460  18460  18480  18490  18530  18540  18560  18880  18970  18990  19010  19020  19030  19040  19050
                     19060  19390  19460  19470  19480  19490  19510  20180  20360  20370

Float Array          Q7(7,7)
(Common)               570  11390  11610  11750  11970  12040  12210  12330  13500  13650  13710  14050  14060  14060  14080  14090
                     14090  14140  14160  15400  20190  20770

Float Variable       Q71
(Static)             13530  14080

Float Variable       Q74
(Common)               600   3700  19590  19590  20860

Float Array          Q75(5)
(Common)               600   3700

Float Variable       Q76
(Common)               600  17010  17060  17060

Float Array          Q79(5)
(Common)               600   3700

Float Variable       Q8
(Static)             13800  13810  13840  17930  18180  18330  18340  18340  18340  18340  18360  18400  18420  18430  18440  18820
                     19040  19040  19490  19490  19500  20430  20440

Float Array          Q85(5)
(Common)               600   3700

Float Array          Q89(5)
(Common)               600   3700

Float Variable       R
(Static)             18070  18080  18080  18080  18090  18090  18090  18100  18100  18100  18110  18110  18120  18230  18240  18240
                     18240  18250  18250  18250  18260  18350  18360  18360  18360  18370  18370  18370  18380  18470  18480  18480
                     18480  18490  18490  18490  18500  18500  18500  18500  18510  18580  18590  18600  18600  18600  18610  18620
                     18620  18620  18620  18630  18630  18630  18640  18640  18640  18660  18670  18680  18900  18910  18910  18920
                     18980  18990  18990  19000  19080  19090  19100  19100  19410

Float Array          R0(30)
(Common)               580   2820  10130  10230  10250  10280  10290  11000  11040  16970  16980  17330  17430  17440  17480  17620
                     17660  17700

Float Variable       R01
(Static)              2860   9580  10040  15570

Float Variable       R02
(Common)               560   2870   3020   8120   9580  10040  10230  10270  10270

Float Variable       R03
(Static)              2880   7880   8010   8120   9580  10040  10240

Float Variable       R04
(Static)              2830   7880   8010   8120   9580  10040  10240  10280
```

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Basic Cross Reference

Float Variable     R05
(Static)              2900    7880    8050    8170    9580   10040   10280

Float Variable     R0R
(Static)             10970   10990   10990   11080   14480   14870

Float Variable     R1
(Static)             20130   20160   20170   20180   20200   20210   20250   20270   20280   20290   20300   20300   20310   20320   20320   20360
                     20360   20360   20370   20370   20380   20390   20400   20400   20420   20420   20430   20430   20440   20440   20460   20460
                     20470   20480   20490   20490   20510   20510   20510   20520

Float Array        R2(7,7)
(Static)               650   12210   12360   13470

String Variable    ROUTE$ 7
(Static)               640    4960    5110    5380    5720    5810    6100    6140    6600    6630    6820 [illegible]  7840    7870    8130    8270
                      9400

Float Variable     S
(Static)              4830    4830    5530    5960    5970    5990    6000    6020    6040    6700    6700    9530    9540    9560    9560    9560
                      9570    9980    9990   10010   10010   10020   10020

Float Variable     S1
(Static)              4840    4840    5570    5580    5590    5900    5910    5920    6680    6710    6740    9530    9540    9540    9550    9550
                      9550    9550    9570    9570    9580    9980   10000   10000   10000   10000   10010   10010   10030   10030   10030

Float Array        S1(15,5)
(Common)               560    3040    5470    5490    5510    5530    5650    5730    5740    5740    5760    5770    9540    9540    9540    9540
                      9990    9990    9990    9990   10430   10430   10430   10430   10440   10440   10460   10460   10480   10490   16310   16370
                     16370   16380   16600   20220   20250

Float Variable     S10
(Static)             11790   12240   12250   12260   12270   12340   13680   13770   13780   13780   13920   14180   17880   17910   18190   18190
                     18200   18220   18220   18300   18300   18320   18340   18340   18420   18420   18450   18460   18460   18550   18550

Float Variable     S100
(Static)             18850   18960   18970

Float Variable     S11
(Static)             20040   20050   20050   20100   20110   20280   20290   20300   20310   20340   20450

Float Variable     S12
(Static)             20050   20050   20080   20080   20090   20090   20210   20250   20250   20330   20400   20400   20460   20460   20460   20460

Float Variable     S2
(Static)             14410   14830

String Variable    T$ 5
(Common)               550

String Variable    T0$ 10
(Static)             19720   19730   19740   19750   19760   19860

Float Variable     T1
```

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Basic Cross-Reference

(Static)            14410  14830  17260  17270  17270  17280  17850  17900  17910  17950  18850  19100  19120  19120  19130  19150
                    19160  19170  19170  19170  19180  19200  19200  19210  19210  19220  19220  19270  19280  19280  19290  19290
                    19300  19310  19330  19330  19340  19340  19430  19430  19440  19440  19530  19530  19540  19540  19550  19550
                    20040  20320  20330  20430

Float Variable      T10
(Static)            17280  17280  17350  17370  17390  17540  17550  17560  17600  17610  17660  17680

String Array        T10$(7,7) 26
(Static)              620   3540  15490

Float Variable      T11
(Common)              560  11400  11410  11430  11460  11460  11470  11490  11500  11500  11520  11520  11530  11550  11570  11610
                    11630  11640  11650  11750  11770  11970  12040

String Array        T11$(15) 26
(Static)              630   7790   7800   7810   9350   9590  10060  10110  10120  10130

Float Variable      T12
(Static)            11280  11290  11320  11330  11330  11410  11470  11530  11650  11670  11670  11680  11680  11690  11690  11750

Float Variable      T13
(Static)            11770  11890  11900  11930  12030  12100  12230  12240  12250  12250  12260  12260  12270  12330  13050  13740
                    13920  14140  14170  14180

Float Variable      T14
(Static)            13740  13760  13770  13800

Float Array         T15(20)
(Common)              570  15530  20880

Float Array         T17(20)
(Static)              630  12710  12750  13200  13220  15530  17960  18080  18080  18110  18240  18250  18360  18370  18480  18490
                    18500  20880

Float Array         T18(50)
(Static)              630  12710  12780  12860  12960  12970  13060  13140  13150  13230  13330  13330  13340  13340  13370  13370
                    13370  13370  13380  13380  13380  13380  13390  15530  20880

Float Array         T19(7)
(Static)              630  12710  12720  13020  13050  13230  13240

Float Variable      T2
(Static)            11830  11890  11930  11970  12040  12080  12090  12310  12320  12330  13700  13710  13760  14030  14050  14080
                    14150  14160  14170  17220  17270  17270  17340  17850  17900  17950  18140  18140  18950  20180  20190  20320

Float Variable      T20
(Static)            17340  17390  17390  17400  17420  17460  17460  17480  17490  17540  17540  17550  17560  17950  17980  18000
                    18000  18020  18040  18040  18060

Float Array         T21(7)
(Static)              630  12710  12820  12890  13130

Float Array         T22(50)
(Static)              630  12710  12780  12960  12980  13060  13160  13430  19060  19160  19250  19280  19300  19300  19330  19340
```

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Basic Cross Reference

                    19350

Float Variable      T3
(Static)             17280  17350  17350  17370  17390  17410  17410  17430  17440  17480  17540  17550  17560  17600  17610  17620
                     17660  17660  17680  17690  17690  17700  17950  17990  17990  18000  18000  18090  18090  18100  18100  18240
                     18240  18300  18300  18480  18480  18500  18500  18590  18600  18610  18620  18620  18630  18630  18640  18640
                     18660

Float Variable      T4
(Static)             17300  17310  17320  17340  17610  17620  17630  17680  17680  17700  17710

Float Array         T5(20)
(Common)               560  15530  16390  16390  16390  16400  16400  16410  16410  16420  16420  16450  16450  16490  16500  16510
                     16520  16540  16550  16560  16570  20060  20070  20200  20320  20360  20360  20360  20370  20370  20390  20490
                     20490  20510  20510  20510  20540  20880

Float Variable      T50
(Static)              3690  14520  14520  14560  14720  14760  14810  15120  15570  15830  19850

Float Variable      T51
(Static)              3690  14720  14760  14780  14980  14980  15140  15570  19870

Float Array         T6(20)
(Static)               610  11800  11810  11860  11890  11900  11930  12000  12000  12030  12030  12030  12070  12090  12100  12200
                     12380  12380  12490  12520  12520  12540  12540  12580  12650  12730  12730  13190  13300  13300  13490  13840
                     13840  13900  13910  13910  13910  13930  13930  14130  14170  14180  15530  16030  20070  20530  20880

Float Array         T7(20)
(Static)               610  12200  12340  12500  12530  12530  12550  12550  12660  12730  12730  13310  13310  13430  13630  15530
                     16090  20880

Float Array         T8(20)
(Common)               560  11350  11360  11370  11660  11670  11680  13630  15530  17250  17370  17380  17430  17450  17490  17500
                     17510  17560  17560  17570  17650  17960  17970  17990  18030  18060  18080  18090  18100  18110  18250  18250
                     18370  18370  18490  18490  18500  18600  18600  18620  18620  18630  18640  18670  18870  18910  18910  18930
                     18990  18990  19090  19100  19140  19150  19160  19200  19210  19430  19440  20880

String Array        T9$(7,7) 26
(Common)               580   3530   3540   7530   7640   7650   7670   7680   7700   7710   7730   7810  10130  11280  11340  11400
                     11620  11630  11640  11700  11830  11850  11980  11990  12080  12300  12310  12370  13670  13700  13820  13830
                     14030  14150  15430  15550  15560  18100  18270  18290  18320  18390  18410  18450  18520  18540  20180  20270
                     20470  20480  20800  20810  20840

Float Array         TCO(7,5)
(Common)               570   3220   5990   6000   6020   6040   9560   9560   9560   9570  10010  10010  10020  10020  10610  10620
                     11070  11130

Float Variable      TD
(Static)             13960  13960  14050  14080  20150  20160  20170

String Variable     TGROUP$ 30
(Static)               650   8270   9340   9370   9370   9380   9600   9850   9880   9890   9890   9900  15150  15590

Float Array         TOT(6,3)
(Common)               530   9830  15240  15240  15290  15290  15320  15320  15350  15350  15380  15380
```

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Basic Cross-Reference

Float Array        TOTA(8,3)
(Common)               590    9830   15240   15380

Float Array        TOTN(8,3)
(Common)               590    9830   15240   15380

String Array       TRA$(7) 25
(Common)               600    3420    5900    5970    6700    6700

String Array       TYPE$(14) 30
(Common)               550    3390    3920    3930    4860    4340    4340    4950    5170    5440    5840    6170    6650    7920    7930    9530
                      9610    9930   13710   13800

String Variable    X$ 70
(Common)               590   15800   15810   15820   15830   15840

String Variable    X4$ 130
(Common)               570

String Variable    X5$ 130
(Common)               570

Float Variable     Y
(Static)             16280   16300   16600   16600   16620   16640   16650   16660   16670   16680   16690   16700   16710   16720   16730   16740

String Variable    Z1$ 3
(Common)               580    3490    5080    9530    9880   12140   12410   13540   14220   14530   14690   14910

String Variable    Z2$ 3
(Static)               630    9530    9880

String Variable    Z3$ 3
(Static)               630    3490    5090    9530    9880   13880

String Variable    Z4$ 3
(Common)               580    3490    4960    5110    5120    5380    5720    5780    5810    6100    6110    6140    6600    6610    6630    6820
                      6830    6860    7780    7840    7850    7870    8130    8280    8640    8670    9020    9050   14780   15160   15580
```

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```
 10 SUB "OFFPRIN" (Y$,Y1)
 20 *****************************************************************
 30 *                                                               *
 40 *     OFFPRIN - THIS EXTERNAL SUBROUTINE CONTAINS THE           *
 50 *               SUMMARY CALCULATION AND PRINT ROUTINES          *
 60 *               FOR THE OFFICER REQUIREMENTS MODEL.             *
 70 *                                                               *
 80 *                                      (FILE OKIE11 LINKED TO OKIE12)*
 90 *****************************************************************
100 COM D0(7,4),INVT(9,31),A$22,P5,P6,LABEL$(9)25,TYPE$(14)30,Q11,T$5
110 COM D$8,D8(8),S1(15,5),P0(10),R02,D9(4),I4(7,7),T5(20),T8(20),T11
120 COM P1$(9)130,X4$130,X5$130,B$70,C$70,T15(20),Q7(7,7),TC0(7,5),P9
130 COM A1(15,9),E$130,T9$(7,7)26,Z1$3,Z4$3,Q37(8,4),OUTA(8),R0(30)
140 COM X$70,PR04,PR05,ACC1,MGROUP$30,TOT(8,3),TOTA(8,3),TOTN(8,3)
150 COM PTR(14),TRA$(7)25,Q76,Q85(5),Q89(5),Q75(5),Q79(5),Q74
160 DIM DES$30,TDES$30,Y$130,Q3(7,7),F$70,T6(20),T7(20)
170 DIM Q77(5)
180 SELECT PRINTER
190 STR(D$,1,2) = STR(DATE,3,2)
200 STR(D$,3,1) = "/"
210 STR(D$,4,2) = STR(DATE,5,2)
220 STR(D$,6,1) = "/"
230 STR(D$,7,2) = STR(DATE,1,2)
240 STR(T$,1,2) = STR(TIME,1,2)
250 STR(T$,3,1) = ":"
260 STR(T$,4,2) = STR(TIME,3,2)
270 INIT(HEX(3D))X4$                    /*    (*)    */
280 INIT(HEX(2A))X5$
290 INIT(HEX(20))B$
300 IF Y1 = 8 THEN JMP1407
310 IF Y1 = 9 THEN JMP1409
320 FOR Q = 1 TO 4
330 D9(Q) = 0
340 FOR P = 1 TO 7
350 D9(Q) = D9(Q) + D0(P,Q)
360 NEXT P
370 D9(Q) = (D8(Q) - D9(Q))/D8(Q)
380 NEXT Q
390 JMP501:INIT(HEX(20))P1$(1)
400 STR(P1$(1),1,10) = "WORKING ON"
410 STR(P1$(1),12,P5) = A$
420 STR(P1$(1),13+P5,2) = "IN"
430 STR(P1$(1),16+P5,P6) = TYPE$(Q11)
440 STR(P1$(1),17+P5+P6,9) = "COMMUNITY"
450 ACCEPT AT(5,P9),FAC(HEX(8C)),P1$(1),                                 !
460                 AT(7,10),FAC(HEX(8C)),STR(Y$,1,40),AT(7,54),         !
470                           FAC(HEX(8C)),D$,AT(8,54),FAC(HEX(8C)),T$,  !
480                 AT(10,20),"FRACTION OF FILL",                        !
490                 AT(11,15),"SENIOR COMMANDERS",AT(11,35),             !
500                            FAC(HEX(8C)),D9(4),PIC(##.###),           !
510                 AT(12,15),"COMMANDERS",AT(12,35),FAC(HEX(8C)),       !
520                            D9(3),PIC(##.###),                        !
530                 AT(13,15),"LT. COMMANDERS",AT(13,35),FAC(HEX(8C)),   !
```

```
 540                             D9(2),PIC(##.###),                              !
 550                 AT(14,15),"L.T. AND BELOW",AT(14,35),FAC(HEX(8C)),          !
 560                             D9(1),PIC(##.###),                              !
 570                 AT(15,15),"===========================.",                   !
 580                 AT(17,10),"ACCESSIONS",AT(17,39),FAC(HEX(8C)),              !
 590                             INVT(R,31),PIC(###.##),                         !
 600                 AT(18,10),"FIRST TOUR LENGTH",AT(18,39),                    !
 610                 FAC(HEX(8C)),T11,PIC(###.##),                               !
 620                 AT(20,10),"OUTPUT OPTIONS. PRESS PF KEY:",                  !
 630                 AT(21,15),"1. NODE FLOWS",AT(21,32),"2. INVENTORY",         !
 640                             AT(21,54),"3. REQUIREMENTS",                    !
 650                 AT(22,15),"4. EXCESS FLOW",                                 !
 660                 AT(23,10),"FOR SCREEN PRINTS PRESS PF-11",                  !
 670                 AT(24,10),"PRESS ENTER TO CONTINUE PROGRAM",                !
 680 KEYS(BIN(0)&BIN(1)&BIN(2)&BIN(3)&BIN(4)&BIN(11)&BIN(12)),KEY(MG)
 690 IF MG = 0 THEN END
 700 ON MG GOTO JMP402,JMP403,JMP404,JMP405,,,,,,,JMP5101,JMP5100
 710 GOTO JMP501
 720 JMP5101:GOSUB' 41(Y$)
 730 GOTO JMP501
 740 JMP5100:GOSUB' 47(Y$)
 750 GOTO JMP501
 760 JMP402:/*OUTPUT MATRIX I4*/
 770 FOR P = 1 TO 7
 780 INIT(HEX(20))P1$(P)
 790 FOR R = 1 TO 7
 800 CONVERT I4(P,R) TO STR(P1$(P),7*R-6,6),PIC(###.##)
 810 NEXT R
 820 NEXT P
 830 ACCEPT AT(5,32),"NODE FLOW VALUES",                                     !
 840         AT(7,34),"TOUR NUMBERS",                                        !
 850         AT(9,8),"ACTIVITY",                                             !
 860         AT(9,29),"ONE", AT(9,36),"TWO",AT(9,42),"THREE",                !
 870         AT(9,49),"FOUR",AT(9,56),"FIVE",AT(9,64),"SIX",                 !
 880         AT(9,70),"SEVEN",                                               !
 890         AT(11,2),FAC(HEX(8C)),LABEL$(1),AT(11,27),FAC(HEX(8C)),         !
 900                    P1$(1),CH(49),                                       !
 910         AT(12,2),FAC(HEX(8C)),LABEL$(2),AT(12,27),FAC(HEX(8C)),         !
 920                    P1$(2),CH(49),                                       !
 930         AT(13,2),FAC(HEX(8C)),LABEL$(3),AT(13,27),FAC(HEX(8C)),         !
 940                    P1$(3),CH(49),                                       !
 950         AT(14,2),FAC(HEX(8C)),LABEL$(4),AT(14,27),FAC(HEX(8C)),         !
 960                    P1$(4),CH(49),                                       !
 970         AT(15,2),FAC(HEX(8C)),LABEL$(5),AT(15,27),FAC(HEX(8C)),         !
 980                    P1$(5),CH(49),                                       !
 990         AT(16,2),FAC(HEX(8C)),LABEL$(6),AT(16,27),FAC(HEX(8C)),         !
1000                    P1$(6),CH(49),                                       !
1010         AT(17,2),FAC(HEX(8C)),LABEL$(7),AT(17,27),FAC(HEX(8C)),         !
1020                    P1$(7),CH(49),                                       !
1030         AT(19,5),"******************************************************!
1040 ***************************",                                           !
1050         AT(22,10),"PRESS ENTER TO RETURN TO OUTPUT MENU",               !
1060                        KEYS(BIN(0)&BIN(11)),ON (BIN(0)&BIN(11)) GOTO    !
```

```
1070                   JMP501,JMP5102
1080 JMP5102:GOSUB' 42(Y$)
1090 GOTO JMP501
1100 JMP403:/*OUTPUT SELECTED INVENTORY ENTRIES*/
1110 ACCEPT AT(5,32),"INVENTORY DISPLAY",                             !
1120        AT(7,10),"SELECT FOUR YEARS FOR OUTPUT BETWEEN 1 AND 30", !
1130        AT(10,15),"FIRST YEAR",AT(10,30),T15(1),                 !
1140                   PIC(##),                                       !
1150        AT(12,15),"SECOND YEAR",AT(12,30),T15(2),                !
1160                   PIC(##),                                       !
1170        AT(14,15),"THIRD YEAR",AT(14,30),T15(3),                 !
1180                   PIC(##),                                       !
1190        AT(16,15),"FOURTH YEAR",AT(16,30),T15(4),                !
1200                   PIC(##),                                       !
1210        AT(21,10),"PRESS PF2 TO RETURN TO OUTPUT MENU",           !
1220        AT(23,10),"PRESS PF1 TO CONTINUE",                        !
1230 KEYS(BIN(0)&BIN(1)&BIN(2)&BIN(11)),ON(BIN(1)&BIN(2)&BIN(11)) GOTO!
1240 JMP502,JMP501,JMP5103
1250 GOTO JMP502
1260 JMP5103:GOSUB' 43(Y$)
1270 GOTO JMP501
1280 JMP502:/*CREATE AND DISPLAY INVT SELECTION*/
1290 FOR P = 1 TO 9
1300 INIT(HEX(20))P1$(P)
1310 STR(P1$(P),1,24) = LABEL$(P)
1320 FOR R = 1 TO 4
1330 CONVERT INVT(P,T15(R)) TO STR(P1$(P),18+9*R,6),PIC(###.##)
1340 NEXT R
1350 NEXT P
1360 ACCEPT AT(3,32),"INVENTORY DISPLAY",                             !
1370        AT(7,38),"YEARS",                                         !
1380        AT(8,16),"ACTIVITY",AT(8,38),FAC(HEX(8C)),T15(1),PIC(##), !
1390        AT(8,47),FAC(HEX(8C)),T15(2),PIC(##),AT(8,56),FAC(HEX(8C))!
1400            ,T15(3),PIC(###),AT(8,65),FAC(HEX(8C)),T15(4),PIC(##), !
1410        AT(10,8),FAC(HEX(8C)),P1$(1),                             !
1420        AT(11,8),FAC(HEX(8C)),P1$(2),                             !
1430        AT(12,8),FAC(HEX(8C)),P1$(3),                             !
1440        AT(13,8),FAC(HEX(8C)),P1$(4),                             !
1450        AT(14,8),FAC(HEX(8C)),P1$(5),                             !
1460        AT(15,8),FAC(HEX(8C)),P1$(6),                             !
1470        AT(16,8),FAC(HEX(8C)),P1$(7),                             !
1480        AT(17,8),FAC(HEX(8C)),P1$(8),                             !
1490        AT(19,5),"************************************************!
1500 **********************",                                         !
1510        AT(21,8),FAC(HEX(8C)),P1$(9),                             !
1520        AT(23,5),"************************************************!
1530 **********************",                                         !
1540        AT(24,10),"PRESS ENTER TO RETURN TO OUTPUT MENU",         !
1550 KEYS(BIN(0)&BIN(11)),ON (BIN(0)&BIN(11)) GOTO JMP501,JMP5104
1560 JMP5104:GOSUB' 44(Y$)
1570 GOTO JMP501
1580 JMP404:/*DISPLAY REQUIREMENTS MATRIX*/
1590 FOR P = 1 TO 7
```

```
1600 INIT(HEX(20))P1$(P)
1610 STR(P1$(P),1,24) = LABEL$(P)
1620 FOR R = 1 TO 4
1630 CONVERT DO(P,R) TO STR(P1$(P),18+9*R,7),PIC(####.##)
1640 NEXT R
1650 NEXT P
1660 INIT(HEX(20))P1$(8)
1670 STR(P1$(8),1,24) = "LOWER GRADE FILLS"
1680 FOR R = 1 TO 3
1690 CONVERT Q37(8,R) TO STR(P1$(8),27+9*R,7),PIC(####.##)
1700 NEXT R
1710 ACCEPT AT(3,31),"REQUIREMENTS DISPLAY",                                    !
1720          AT(7,36),"CATEGORY",                                              !
1730          AT(8,16),"ACTIVITY",AT(8,37),"LT",AT(8,46),"LCDR",                !
1740          AT(8,55),"CDR",AT(8,64),"CDR+",                                   !
1750          AT(10,8),FAC(HEX(8C)),P1$(1),                                     !
1760          AT(11,8),FAC(HEX(8C)),P1$(2),                                     !
1770          AT(12,8),FAC(HEX(8C)),P1$(3),                                     !
1780          AT(13,8),FAC(HEX(8C)),P1$(4),                                     !
1790          AT(14,8),FAC(HEX(8C)),P1$(5),                                     !
1800          AT(15,8),FAC(HEX(8C)),P1$(6),                                     !
1810          AT(16,8),FAC(HEX(8C)),P1$(7),                                     !
1820          AT(18,5),"****************************************************************!
1830 *************************",                                               !
1840          AT(20,8),FAC(HEX(8C)),P1$(8),                                     !
1850          AT(22,5),"****************************************************************!
1860 *************************",                                               !
1870          AT(24,10),"PRESS ENTER TO RETURN TO OUTPUT MENU",                 !
1880 KEYS(BIN(0)&BIN(11)), ON (BIN(0)&BIN(11)) GOTO JMP501,JMP5105
1890 JMP5105:GOSUB' 45(Y$)
1900 GOTO JMP501
1910 JMP405:/*DISPLAY ELAPSED TIME (Q7) */
1920 FOR P = 1 TO 8
1930 INIT(HEX(20))P1$(P)
1940 STR(P1$(P),1,24) = LABEL$(P)
1950 FOR R = 1 TO 7
1960 CONVERT ROUND(Q7(P,R),0) TO STR(P1$(P),21+6*R,5),PIC(###)
1970 NEXT R
1980 NEXT P
1990 STR(P1$(8),1,24) = "NON-AVIATION MAN-YEARS"
2000 FOR R = 1 TO 7
2010 CONVERT ROUND(OUTA(R),1) TO STR(P1$(8),21+6*R,5),PIC(###.#)
2020 NEXT R
2030 ACCEPT AT(3,28),"ELAPSED TIME (Q7) DISPLAY",                               !
2040          AT(7,38),"TOUR",                                                  !
2050          AT(8,16),"ACTIVITY",AT(8,37),"1",AT(8,43),"2",AT(8,49),           !
2060          "3",AT(8,55),"4",AT(8,61),"5",AT(8,67),"6",AT(8,73),"7",          !
2070          AT(10,8),FAC(HEX(8C)),P1$(1),                                     !
2080          AT(11,8),FAC(HEX(8C)),P1$(2),                                     !
2090          AT(12,8),FAC(HEX(8C)),P1$(3),                                     !
2100          AT(13,8),FAC(HEX(8C)),P1$(4),                                     !
2110          AT(14,8),FAC(HEX(8C)),P1$(5),                                     !
2120          AT(15,8),FAC(HEX(8C)),P1$(6),                                     !
```

```
2130          AT(16,8);FAC(HEX(8C)),P1$(7);                                           !
2140          AT(18,5),"***************************************************!
2150 ************************";                                                    !
2160          AT(20,8);FAC(HEX(8C)),P1$(8),                                           !
2170          AT(22,5),"***************************************************!
2180 ************************";                                                    !
2190          AT(24,10),"PRESS ENTER TO RETURN TO OUTPUT MENU";                      !
2200 KEYS(BIN(0)&BIN(11));ON (BIN(0)&BIN(11)) GOTO JMP501,JMP5106
2210 JMP5106:GOSUB' 46(Y$)
2220 GOTO JMP501
2230 RETURN
2240 /*                                               OPTION 8 */
2250 JMP1407:D3 = 0
2260 MAT T5 = ZER:MAT T8 = ZER
2270 FOR Q = 1 TO ROUND(PRO4/12-1,0)
2280 FOR P = 1 TO 7
2290 T8(1) = T8(1) + INVT(P,Q)
2300 NEXT P
2310 T8(1) = T8(1) + INVT(9,Q)
2320 NEXT Q
2330 FOR Q = ROUND(PRO4/12,0) TO ROUND(PRO5/12-1,0)
2340 FOR P = 1 TO 7
2350 T8(2) = T8(2) + INVT(P,Q)
2360 NEXT P
2370 T8(2) = T8(2) + INVT(9,Q)
2380 NEXT Q
2390 FOR Q = ROUND(PRO5/12,0) TO ROUND(PRO5/12+3,0)
2400 FOR P = 1 TO 7
2410 T8(3) = T8(3) + INVT(P,Q)
2420 NEXT P
2430 T8(3) = T8(3) + INVT(9,Q)
2440 NEXT Q
2450 FOR Q = ROUND(PRO5/12+4,0) TO 30
2460 FOR P = 1 TO 7
2470 T8(4) = T8(4) + INVT(P,Q)
2480 NEXT P
2490 T8(4) = T8(4) + INVT(9,Q)
2500 NEXT Q
2510 FOR Q = 1 TO 11
2520 FOR P = 1 TO 4
2530 T5(1) = T5(1) + INVT(P,Q)
2540 NEXT P
2550 FOR P = 5 TO 7
2560 T5(2) = T5(2) + INVT(P,Q)
2570 NEXT P
2580 T5(2) = T5(2) + INVT(9,Q)
2590 NEXT Q
2600 T8(5) = (11*T5(1))/(6*(T5(1)+T5(2)))
2610 FOR Q = 12 TO 18
2620 FOR P = 1 TO 4
2630 T5(1) = T5(1) + INVT(P,Q)
2640 NEXT P
2650 FOR P = 5 TO 7
```

```
2660 T5(2) = T5(2) + INVT(P,Q)
2670 NEXT P
2680 T5(2)=T5(2)+INVT(9,Q)
2690 NEXT Q
2700 T8(6) = (18*T5(1))/(11*(T5(1)+T5(2)))
2710 T8(7) = (18*T5(1))/(9*(T5(1)+T5(2)))
2720 GOSUB' 81(4)
2730 T8(8) = D3
2740 GOSUB' 81(5)
2750 T8(8) = T8(8) + D3
2760 GOSUB' 81(6)
2770 T8(9) = D3
2780 FOR P = 1 TO 4
2790 T8(P) = ROUND(T8(P),0)
2800 NEXT P
2810 FOR P = 5 TO 9
2820 T8(P) = ROUND(T8(P),2)
2830 NEXT P
2840 X45 = ROUND(INVT(8,31),0):X46 = ROUND(T11,0)
2850 IF Z4$ = "YES" THEN JMP1412
2860 SELECT CRT
2870 D3 = T8(1)+T8(2)+T8(3)+T8(4)
2880 INIT(HEX(20))P1$(1)
2890 STR(P1$(1),1+P9,P5) = A$
2900 STR(P1$(1),3+P5+P9,2) = "IN"
2910 STR(P1$(1),6+P5+P9,P6) = TYPE$(Q11)
2920 STR(P1$(1),7+P5+P6+P9,9) = "COMMUNITY"
2930 ACCEPT AT(5,1),FAC(HEX(8C)),P1$(1),
2940                    AT(7,10),FAC(HEX(8C)),STR(X$,1,40),AT(7,54),
2950                                FAC(HEX(8C)),D$,AT(8,54),FAC(HEX(8C)),T4,
2960           AT(9,10),"COMMUNITY POPULATION",AT(9,45),"FLEET OPPORTUNIT
2970 Y",
2980           AT(10,7),"GRADE",AT(10,16),"NUMBER",
2990           AT(11,5),"SENIOR CDR",AT(11,18),FAC(HEX(8C)),T8(1),
3000 PIC(####),
3010           AT(12,5),"JUNIOR CDR",AT(12,18),FAC(HEX(8C)),T8(2),
3020 PIC(####),AT(12,40),"COMMAND OPPORTUNITY",AT(12,62),FAC(HEX(8C)),
3030 T8(9),PIC(#.##),
3040           AT(13,5),"LT. CDR",AT(13,18),FAC(HEX(8C)),T8(3),PIC(####),
3050 AT(13,40),"DEPT HEAD OPPORTUNITY",AT(13,62),FAC(HEX(8C)),T8(8),
3060 PIC(#.##),
3070       AT(14,5),"LIEUTENANT",AT(14,18),FAC(HEX(8C)),T8(4),PIC(####),
3080           AT(16,5),"TOTAL",AT(16,18),FAC(HEX(8C)),D3,PIC(####),
3090           AT(17,5),"*************************************************
3100 ************************",
3110           AT(18,50),"ACIP PROJECTION",
3120           AT(19,5),"ACCESSIONS        ",AT(19,23),FAC(HEX(8C)),
3130           X45,PIC(####),AT(19,50),"GATE 1",AT(19,60),
3140           FAC(HEX(8C)),T8(5),PIC(#.##),
3150           AT(20,50),"GATE 2",AT(20,60),FAC(HEX(8C)),T8(6),PIC(#.##),
3160           AT(21,5),"FIRST TOUR LENGTH",AT(21,25),FAC(HEX(8C)),
3170           X46,PIC(##),AT(21,50),"GATE 3",AT(21,60),
3180            FAC(HEX(8C)),T8(7),PIC(#.##),
3190         AT(23,5),"DO YOU WISH TO CONTINUE IN-PROCESS MONITORING?",!
3200 AT(23,55),FAC(HEX(81)),Z1$,CH(3),AT(23,61),"(YES/NO)",          !
3210         AT(24,5),"PRESS ENTER TO CONTINUE",AT(24,35),"PRESS PF-1 T!
3220 O SUPPRESS PRINT",KEYS(BIN(0)&BIN(1)),KEY(PR)
3230 JMP1412:IF PR=1 THEN END
3240 MAT Q9=ZER
3250 MAT T5=ZER
3260 FOR P = 1 TO 7
3270 FOR Q = 1 TO ROUND(PR04/12-1,0)
3280 Q9(P,1) = Q9(P,1) + INVT(P,Q)
3290 Q9(P,5) = Q9(P,5) + INVT(P,Q)
3300 NEXT Q
3310 FOR Q = ROUND(PR04/12,0) TO ROUND(PR05/12-1,0)
3320 Q9(P,2) = Q9(P,2) + INVT(P,Q)
3330 Q9(P,5) = Q9(P,5) + INVT(P,Q)
3340 NEXT Q
3350 FOR Q = ROUND(PR05/12,0) TO ROUND(PR05/12+3,0)
3360 Q9(P,3) = Q9(P,3) + INVT(P,Q)
3370 Q9(P,5) = Q9(P,5) + INVT(P,Q)
3380 NEXT Q
3390 FOR Q = ROUND(PR05/12+4,0) TO 30
3400 Q9(P,4) = Q9(P,4) + INVT(P,Q)
3410 Q9(P,5) = Q9(P,5) + INVT(P,Q)
3420 NEXT Q
3430 NEXT P
3440 FOR P = 1 TO 7
3450 FOR Q = 1 TO 7
3460 Q9(P,Q) = ROUND(Q9(P,Q),0)
3470 NEXT Q
3480 NEXT P
3490 FOR Q = 1 TO ROUND(PR04/12-1,0)
3500 T5(1) = T5(1) + INVT(9,Q)
3510 T5(5) = T5(5) + INVT(9,Q)
3520 NEXT Q
3530 FOR Q = ROUND(PR04/12,0) TO ROUND(PR05/12-1,0)
3540 T5(2) = T5(2) + INVT(9,Q)
3550 T5(5) = T5(5) + INVT(9,Q)
3560 NEXT Q
3570 FOR Q = ROUND(PR05/12,0) TO ROUND(PR05/12+3,0)
3580 T5(3) = T5(3) + INVT(9,Q)
3590 T5(5) = T5(5) + INVT(9,Q)
3600 NEXT Q
3610 FOR Q = ROUND(PR05/12+4,0) TO 30
3620 T5(4) = T5(4) + INVT(9,Q)
3630 T5(5) = T5(5) + INVT(9,Q)
3640 NEXT Q
3650 FOR P = 1 TO 5
3660 T5(P) = ROUND(T5(P),0)
3670 NEXT P
3680 D3 = T8(1) + T8(2) + T8(3) + T8(4)
3690 Q = LEN(TYPE$(Q11)):R = INT((25-Q)/2)
3700 STR(B$,R,Q) = TYPE$(Q11)
3710 STR(B$,R+Q+2,9) = "COMMUNITY"
```

```
3720 SELECT PRINTER
3730 PRINT PAGE
3740 PRINT SKIP(4)
3750 PRINT TAB(53),"SUMMARY DATA"
3760 PRINT SKIP(1),TAB(43),B$;
3770 IF Z4$="YES" THEN PRINT TAB(120),"GROUP ";STR(Y$,130,1)
3780 IF A$ = "NAVAL AVIATORS" THEN PRINT TAB(58),A$,TAB(120),D$ ELSE    !
3790  PRINT TAB(55),A$,TAB(120),D$
3800 PRINT TAB(120),T$
3810 PRINT SKIP(1),X5$
3820 PRINT SKIP(1)
3830 IF S1(Q11,1)>0 THEN JMP1420
3840 PRINT USING SHP20,"RETENTION",ROUND(RO2*100,0),"%","NO"
3850 PRINT USING SHP30,"COMMUNITY"
3860 PRINT USING SHP31,"PLOWBACK FRACTION",PO(1)*100,"%","PLANNING"
3870 PRINT USING SHP51,"FACTORS."
3880 GOTO JMP1421
3890 JMP1420:PRINT USING SHP20,"RETENTION",ROUND(RO2*100,0),"%",        !
3900 "NUMBER OF SQUADRONS",S1(Q11,1)
3910 SHP20:FMT COL(10),CH(20),COL(32),PIC(##),COL(35),CH(1),COL(75),    !
3920 CH(25),COL(105),PIC(##)
3930 PRINT USING SHP30,"AIRCRAFT PER SQUADRON",S1(Q11,2)
3940 SHP30:FMT COL(74),CH(25),COL(105),PIC(##)
3950 PRINT USING SHP31,"PLOWBACK FRACTION",PO(1)*100,"%","CREW FACTOR"!
3960 ,S1(Q11,3)
3970 SHP31:FMT COL(10),CH(20),COL(32),PIC(##),COL(35),CH(1),COL(74),    !
3980 CH(25),COL(106),PIC(#.##)
3990 INIT(HEX(20))F$
4000 STR(F$,1,LEN(A$)) = A$
4010 STR(F$,2+LEN(A$),8) = "PER CREW"
4020 IF A$ = "NAVAL AVIATORS" THEN S = 4 ELSE S = 5
4030 PRINT USING SHP51,F$,S1(Q11,S)
4040 SHP51:FMT COL(74),CH(30),COL(100),PIC(#.##)
4050 JMP1421:PRINT SKIP(1),X5$
4060 PRINT SKIP(2),TAB(57),"COMMUNITY POPULATION"
4070 PRINT SKIP(1)
4080 IF A$ = "NAVAL AVIATORS" THEN                                      !
4090          TDES$ = "ACCESSIONS TO TRAINING (132X)" ELSE              !
4100          TDES$ = "ACCESSIONS TO TRAINING (137X)"
4110 IF A$ = "NAVAL AVIATORS" THEN                                      !
4120           DES$ = "ACCESSIONS TO 131X DESIGNATOR" ELSE              !
4130           DES$ = "ACCESSIONS TO 132X DESIGNATOR"
4140 IF A$ = "NAVAL AVIATORS" THEN J1 = 1 ELSE J1 = 2
4150 ACC1 = (INVT(8,31))*TCO(A1(Q11,J1),1)
4160 PRINT USING SHP33,TDES$,ROUND(ACC1,0),"SENIOR COMMANDERS",TR(4)
4170 SHP33:FMT COL(10),CH(30),COL(42),PIC(####),COL(55),CH(18),COL(75)!
4180 ,PIC(####)
4190 PRINT USING SHP34,"COMMANDERS",TR(3),"COMMAND OPPORTUNITY",TR(3)
4200 SHP34:FMT COL(55),CH(18),COL(75),PIC(####),COL(80),CH(23),COL(115!
4210 ),PIC(#.##)
4220 PRINT USING SHP35,DES$,ROUND(INVT(8,31),0),"LT. COMMANDERS",TR(2)!
4230 ,"DEPT HEAD OPPORTUNITY",TR(8)
4240 SHP35:FMT COL(10),CH(30),COL(42),PIC(####),COL(55),CH(18),COL(75)!
```

```
4250 ,PIC(####),COL(90),CH(23),COL(115),PIC(#.##)
4260 PRINT USING SHP33,"FIRST TOUR LENGTH",X46,"LIEUTENANTS",T8(1)
4270 PRINT SKIP(1)
4280 PRINT USING SHP34,"       TOTALS",D3
4290 D3 = ROUND((T5(5)/D3)*100,0)
4300 PRINT SKIP(1),X5$
4310 PRINT SKIP(2),TAB(29),"DISTRIBUTION BY GRADE AND ACTIVITY"
4320 PRINT SKIP(1),TAB(21),"ACTIVITY                                GRADE"
4330 PRINT TAB(45),"LT      LCDR     CDR    SEN CDR   TOTAL
4340  ACIP PROJECTIONS"
4350 INIT(HEX(20))P1$()
4360 FOR P = 1 TO 7
4370 STR(P1$(P),14,25)=LABEL$(P)
4380 FOR Q = 1 TO 5
4390 CONVERT Q9(P,Q) TO STR(P1$(P),31+8*Q,8),PIC(########)
4400 NEXT Q
4410 NEXT P
4420 STR(P1$(8),14,25)=LABEL$(9)
4430 FOR Q = 1 TO 5
4440 CONVERT T5(Q) TO STR(P1$(8),31+8*Q,8),PIC(########)
4450 NEXT Q
4460 FOR P = 2 TO 4
4470 STR(P1$(P),94,4) = "GATE"
4480 CONVERT P-1 TO STR(P1$(P),100,1),PIC(#)
4490 CONVERT T8(P+3) TO STR(P1$(P),106,4),PIC(#.##)
4500 NEXT P
4510 STR(P1$(8),86,25) = "NON-AVIATION             %"
4520 CONVERT D3 TO STR(P1$(8),107,2),PIC(##)
4530 FOR P = 1 TO 8
4540 PRINT P1$(P)
4550 NEXT P
4560 IF A$ = "NAVAL AVIATORS" THEN MAT Q77 = Q85 ELSE MAT Q77 = Q89
4570 STR(P1$(9),14,25) = "LOWER GRADE FILLS"
4580 FOR P = 2 TO 3
4590 CONVERT ROUND(Q37(8,P),0) TO STR(P1$(9),31+8*P,8),PIC(########)
4600 Q77(P) = Q77(P)+ROUND(Q37(8,P),0)
4610 NEXT P
4620 T5(20) = ROUND(Q37(8,2)+Q37(8,3)+Q37(8,4),0)
4630 Q78 = 0
4640 IF Q37(8,2)/D8(2)>Q37(8,3)/D8(3) THEN Q78 = Q37(8,2)/D8(2) ELSE
4650     Q78 = Q37(8,3)/D8(3)
4660 IF Q78<Q37(8,4)/D8(4) THEN Q78 = Q37(8,4)/D8(4)
4670 IF ROUND(Q78,2) = 0 THEN JMP1408
4680 PRINT SKIP(1),TAB(14),STR(X4$,1,97)
4690 FOR P = 2 TO 4
4700 IF ROUND(Q78,2)=ROUND(Q37(8,P)/D8(P),2) THEN JMP1406
4710 NEXT P
4720 JMP1406:STR(P1$(9),86,25) = "HI UP DETAIL             %"
4730 IF P = 2 THEN GRA$ = "(LCDR)"
4740 IF P = 3 THEN GRA$ = "(CDR)"
4750 IF P = 4 THEN GRA$ = "(SR CDR)"
4760 STR(P1$(9),99,8) = STR(GRA$,1,8)
4770 CONVERT ROUND(Q78,2)*100 TO STR(P1$(9),108,2),PIC(##)
```

```
4780 PRINT P1$(9)
4790 IF A$="NAVAL AVIATORS" THEN MAT Q85 = Q77 ELSE MAT Q89 = Q77
4800 PRINT TAB(14),STR(X4$,1,97)
4810 JMP1408:FOR P = 1 TO 7
4820 FOR Q = 1 TO 7
4830 T5(17) = T5(17) + I4(P,Q)
4840 NEXT Q
4850 NEXT P
4860 T5(17) = T5(17)-Q74
4870 T5(15) = ACC1
4880 T5(16) = ACC1 - INVT(8,31)
4890 T5(18) = Q76
4900 IF A$ = "NAVAL FLIGHT OFFICERS" THEN JMP1410
4910 FOR P = 1 TO 4
4920 T5(14+P) = ROUND(T5(14+P),0)
4930 Q75(P) = Q75(P) + T5(14+P)
4940 Q75(5) = Q75(5) + T5(14+P)
4950 NEXT P
4960 GOTO JMP1411
4970 JMP1410:FOR P = 1 TO 4
4980 T5(14+P) = ROUND(T5(14+P),0)
4990 Q79(P) = Q79(P) + T5(14+P)
5000 Q79(5) = Q79(5) + T5(14+P)
5010 NEXT P
5020 JMP1411:INIT(HEX(20))P1$(1)
5030 STR(P1$(1),30,38) = "TOTAL ANNUAL PCS MOVES THIS COMMUNITY "
5040 CONVERT (T5(15)+T5(16)+T5(17)+T5(18)) TO STR(P1$(1),74,5),
5050   PIC(#####)
5060 PRINT SKIP(1),X5$
5070 PRINT SKIP(1),P1$(1)
5080 PRINT SKIP(1),X5$
5090 PRINT SKIP(1),TAB(1),STR(Y$,1,129)
5100 SELECT CRT
5110 END
5120 JMP1409:GOSUB' 58
5130 PRINT PAGE
5140 SELECT CRT
5150 END
5160 ************************************************************
5170 *                                                          *
5180 *     #81 - THIS SUBROUTINE COMPUTES FLEET ASSIGNMENT      *
5190 *           OPPORTUNITY GIVEN THE TOUR NUMBER J.  THE      *
5200 *           RESULT IS RETURNED TO OUTPUT PRINT ROUTINE     *
5210 *                                                          *
5220 ************************************************************
5230 DEFFN' 81(J)
5240 D3=0:MAT T6 = ZER:MAT T7 = ZER
5250 FOR N = 1 TO 7
5260 IF STR(T9$(1,J),3*N,3) = "NNN" THEN JMP8102
5270 CONVERT STR(T9$(1,J),3*N,3) TO T6(N)
5280 FOR I = 1 TO 7
5290 IF STR(T9$(I,J),3*N,3) = "NNN" THEN JMP8101
5300 CONVERT STR(T9$(I,J),3*N,3) TO T7(20)
```

```
5310 T7(N) = T7(N) + T7(20)
5320 JMP8101:NEXT I
5330 JMP8102:NEXT N
5340 FOR N = 1 TO 7
5350 IF T7(N) <= 0 THEN JMP8103
5360 T1 = Q7(N,J-1)
5370 T6(N) = (T6(N)/T7(N))*I4(N,J-1)
5380 T7(20) = INVT(8,31)
5390 FOR P = 1 TO INT((T1/12)+1)
5400 T7(20) = T7(20)*RO(P)
5410 NEXT P
5420 D3 = D3 + T6(N)/T7(20)
5430 JMP8103:NEXT N
5440 RETURN
```

```
5450 ***********************************************************************
5460 *                                                                     *
5470 *      #5B - THIS SUBROUTINE PRODUCES A SUMMARY PRINT                  *
5480 *            FOR MULTIPLE COMMUNITY RUNS WHICH GIVES                  *
5490 *            ACTIVITY/GRADE DISTRIBUTIONS AND AN                      *
5500 *            ACCESSION SUMMARY.                                       *
5510 *                                                                     *
5520 ***********************************************************************
5530 DEFFN' 5B
5540 MAT T6 = ZER:MAT T7 = ZER
5550 FOR P = 1 TO 8
5560 FOR Q = 1 TO 3
5570 TOTA(P,Q) = ROUND(TOTA(P,Q),0)
5580 TOTN(P,Q) = ROUND(TOTN(P,Q),0)
5590 T7(P) = T7(P) + TOTA(P,Q)
5600 T7(P+8) = T7(P+8) + TOTN(P,Q)
5610 NEXT Q
5620 NEXT P
5630 FOR Q = 1 TO 3
5640 FOR P = 1 TO 8
5650 T6(Q) = T6(Q) + TOTA(P,Q)
5660 T6(Q+3) = T6(Q+3) + TOTN(P,Q)
5670 NEXT P
5680 NEXT Q
5690 FOR P = 1 TO 3
5700 PTR(P) = ROUND(PTR(P),0)
5710 PTR(P+7) = ROUND(PTR(P+7),0)
5720 T6(7) = T6(7) + PTR(P)
5730 T6(8) = T6(8) + PTR(P+7)
5740 NEXT P
5750 FOR P = 4 TO 7
5760 PTR(P) = ROUND(PTR(P),0)
5770 PTR(P+7) = ROUND(PTR(P+7),0)
5780 T6(9) = T6(9) + PTR(P)
5790 T6(10) = T6(10) + PTR(P+7)
5800 NEXT P
5810 SELECT PRINTER
5820 PRINT PAGE
5830 PRINT SKIP(4)
5840 PRINT TAB(55),"MULTIPLE RUN SUMMARY";
5850 PRINT TAB(106),D$
5860 PRINT TAB(106),T$
5870 A$ = "NAVAL AVIATORS":MAT TOT = TOTA:K1,K2 = 0:MAT Q77 = Q75
5880 FOR P = 1 TO 15
5890 IF STR(MGROUP$,P,1)<>"X" AND STR(BGROUP$,P,1)<>"O" THEN JMP580)
5900 NEXT P
5910 A$ = "NAVAL FLIGHT OFFICERS":MAT TOT=TOTN:K1=8:K2=3:MAT Q77 = Q73
5920 JMP5801:PRINT SKIP(1),TAB(58),A$
5930 PRINT SKIP(1),X5$
5940 PRINT SKIP(1),TAB(48),"DISTRIBUTION BY GRADE AND ACTIVITY"
5950 PRINT SKIP(1),TAB(38),"ACTIVITY                                   GRADE"
5960 PRINT TAB(61),"LT     LCDR      CDR     TOTAL"
```

```
5970 FOR P = 1 TO 7
5980 PRINT USING SHP5801,LABEL$(P);
5990 FOR Q = 1 TO 3
6000 PRINT USING SHP5802,TOT(P,Q);
6010 NEXT Q
6020 PRINT USING SHP5803,T7(P+K1)
6030 NEXT P
6040 PRINT USING SHP5801,LABEL$(9);
6050 FOR Q = 1 TO 3
6060 PRINT USING SHP5802,TOT(8,Q);
6070 NEXT Q
6080 PRINT USING SHP5803,T7(8+K1);
6090 PRINT SKIP(0),TAB(58),"_____    ______    ______    ______"
6100 PRINT SKIP(1)
6110 PRINT TAB(30),"TOTALS";
6120 T7(17)=0
6130 FOR Q = 1 TO 3
6140 T7(17) = T7(17) + T6(Q+K2)
6150 PRINT USING SHP5802,T6(Q+K2);
6160 NEXT Q
6170 PRINT USING SHP5803,T7(17)
6180 PRINT SKIP(1),X5$
6190 PRINT SKIP(1),TAB(30),"TOTAL ANNUAL PCS MOVES ";
6200 PRINT USING SHP5803,Q77(5)
6210 PRINT SKIP(1),X5$
6220 PRINT SKIP(1)
6230 PRINT TAB(45),"ACCESSION REQUIREMENTS BY TRAINING PIPELINE"
6240 PRINT SKIP(2),TAB(63),"TO TRAINING       TO DESIGNATOR";
6250 IF A$ = "NAVAL AVIATORS" THEN PRINT " (PTR)" ELSE PRINT " (NFOTR)"
6260 IF A$ = "NAVAL AVIATORS" THEN L=0 ELSE L=3
6270 FOR P = 1 TO 3
6280 PRINT USING SHP5801,TRA$(P+L);
6290 PRINT USING SHP5804,PTR(P+L+7);
6300 PRINT USING SHP5805,PTR(P+L);
6310 IF P<3 THEN PRINT
6320 NEXT P
6330 IF L > 0 THEN PRINT ELSE JMP5806
6340 PRINT USING SHP5801,TRA$(7);
6350 PRINT USING SHP5804,PTR(14);
6360 PRINT USING SHP5805,PTR(7);
6370 T6(7) = T6(9):T6(8)=T6(10)
6380 JMP5806:PRINT SKIP(0),TAB(66),"_____",TAB(85),"_____"
6390 PRINT SKIP(1),TAB(30),"TOTALS";
6400 PRINT USING SHP5804,T6(8);
6410 PRINT USING SHP5805,T6(7)
6420 PRINT SKIP(1),X5$
6430 IF L = 3 THEN L = 15
6440 K = 0
6450 FOR P = 1 TO 14
6460 IF STR(MGROUP$,P+L,1)<>"X" AND STR(BGROUP$,P+L,1)<>"0" THEN
6470      JMP5808
6480 IF K>0 THEN JMP5809
6490 K=1
```

```
6500 PRINT SKIP(1),TAB(20),"NOTE: THE FOLLOWING SUBCOMMUNITIES ARE NOT"
6510 PRINT TAB(26),"INCLUDED IN THE RESULTS PRESENTED ABOVE:"
6520 PRINT SKIP(1)
6530 JMP5B09:PRINT TAB(30),TYPE$(P)
6540 JMP5B08:NEXT P
6550 IF K=0 THEN JMP5B11
6560 PRINT SKIP(1),X5$
6570 JMP5B11:PRINT TAB(70),Y$:IF L>0 THEN RETURN
6580 FOR P = 16 TO 30
6590 IF STR(MGROUP$,P,1)<>"X" AND STR(BGROUP$,P,1)<>"O" THEN JMP5B10
6600 NEXT P
6610 RETURN
6620 JMP5B10:A$="NAVAL FLIGHT OFFICERS":MAT TOT=TOTN:K1=8:K2=3
6630 MAT Q77 = Q79
6640 PRINT PAGE
6650 PRINT SKIP(4)
6660 PRINT TAB(55),"MULTIPLE RUN SUMMARY (CONT.)"
6670 GOTO JMP5B01
6680 SHP5B01:FMT COL(30),CH(25)
6690 SHP5B02:FMT COL(55),PIC(########)
6700 SHP5B03:FMT COL(80),PIC(########)
6710 SHP5B04:FMT COL(63),PIC(########)
6720 SHP5B05:FMT COL(82),PIC(########)
```

```
6740 ****************************************************************
6750 *                                                               *
6760 *      #41 - THIS SUBROUTINE CREATES A PRINT OF THE             *
6770 *            SUMMARY SCREEN FOR THE CURRENT RUN/ITERATION.      *
6780 *                                                               *
6790 ****************************************************************
6800 DEFFN' 41(Y$)
6810 SELECT PRINTER
6820 N$ = HEX(FF)
6830 D10=ROUND(INVT(R,31),2)
6840 P9 = INT((79-P5-P6-25)/2)
6850 PRINT PAGE
6860 PRINT X5$
6870 PRINT SKIP(4),COL(21+P9),P1$(1)
6880 PRINT USING SHP10,Y$,D$
6890 SHP10:FMT COL(30),CH(40),COL(80),CH(8)
6900 PRINT COL(80),T$
6910 PRINT SKIP(1),COL(41),"FRACTION OF FILL"
6920 PRINT USING SHP1,"SENIOR COMMANDERS",D9(4)
6930 PRINT USING SHP1,"COMMANDERS",D9(3)
6940 PRINT USING SHP1,"LT. COMMANDERS",D9(2)
6950 PRINT USING SHP1,"LT. AND BELOW",D9(1)
6960 SHP1:FMT COL(36),CH(19),COL(56),PIC(##.###)
6970 PRINT COL(36),"=========================="
6980 PRINT SKIP(1)
6990 PRINT USING SHP2,"ACCESSIONS",D10
7000 PRINT USING SHP2,"FIRST TOUR LENGTH",T11
7010 SHP2:FMT COL(31),CH(18),COL(60),PIC(###.##)
7020 PRINT SKIP(2),X5$
7030 SELECT CRT
7040 N$ = N$ XOR HEX(FF)
7050 RETURN
```

'DEFPRIN' SUBROUTINES

```
7070 ***************************************************************
7080 *                                                             *
7090 *     #42 - THIS SUBROUTINE PRODUCES A PRINT OF THE           *
7100 *           OUTPUT FLOW MATRIX I4 IN RESPONSE TO THE          *
7110 *           SPECIFICATION OF THE USER.                        *
7120 *                                                             *
7130 ***************************************************************
7140 DEFFN' 42(Y$)
7150 SELECT PRINTER
7160 IF N$ = HEX(00) THEN JMP5050
7170 PRINT PAGE
7180 PRINT X5$
7190 JMP5050:N$ = N$ XOR HEX(FF)
7200 FOR P =1 TO 7
7210 INIT(HEX(20))P1$(P)
7220 FOR R = 1 TO 7
7230 CONVERT I4(P,R) TO STR(P1$(P),7*R-6,6),PIC(###.##)
7240 NEXT R
7250 NEXT P
7260 PRINT SKIP(4),TAB(53),"NODE FLOW VALUES"
7270 PRINT SKIP(1),TAB(55),"TOUR NUMBERS"
7280 PRINT SKIP(1)
7290 PRINT USING SHP9, "ACTIVITY","ONE","TWO","THREE","FOUR","FIVE",  !
7300 "SIX","SEVEN"
7310 SHP9:FMT COL(29),CH(8),COL(50),CH(3),COL(57),CH(3),COL(63),CH(5),!
7320 COL(70),CH(4),COL(77),CH(4),COL(85),CH(3),COL(91),CH(5)
7330 PRINT SKIP(1)
7340 SHP3:FMT COL(23),CH(24),COL(48),CH(49)
7350 FOR P=1 TO 7
7360 PRINT USING SHP3, LABEL$(P),P1$(P)
7370 NEXT P
7380 PRINT SKIP(1),TAB(26),"********************************************!
7390 *******************"
7400 PRINT SKIP(2),X5$
7410 SELECT CRT
7420 INIT(HEX(20))B$
7430 IF Y2 = 1 THEN SELECT PRINTER ELSE RETURN
7440 STR(B$,1,LEN(TYPE$(Q11))) = TYPE$(Q11)
7450 STR(B$,LEN(TYPE$(Q11))+2,9) = "COMMUNITY"
7460 IF N$ = HEX(00) THEN JMP5057
7470 PRINT PAGE
7480 PRINT X5$
7490 JMP5057:N$ = N$ XOR HEX(FF)
7500 PRINT SKIP(2),TAB(54),B$
7510 PRINT SKIP(1),TAB(58),"INVENTORY DISPLAY"
7520 PRINT SKIP(1),TAB(54),"YEARS OF AVIATION SERVICE"
7530 PRINT SKIP(1),TAB(10),"ACTIVITY",TAB(32),"1     2     3     4     5  !
7540   6     7     8     9    10    11    12    13    14    15    16    17    18  !
7550  19    20"
```

'OFFPRIN' SUBROUTINES

```
7560 PRINT SKIP(1),TAB(1),X4$
7570 FOR P = 1 TO 8
7580 PRINT USING FLOW10,LABEL$(P);
7590 FOR Q = 1 TO 19
7600 PRINT USING FLOW20, ROUND(INVT(P,Q),0);
7610 NEXT Q
7620 PRINT USING FLOW20, ROUND(INVT(P,20),0)
7630 NEXT P
7640 FLOW10:FMT COL(2),CH(25),XX(2)
7650 FLOW20:FMT COL(28),PIC(###.#)
7660 PRINT SKIP(1),TAB(1),X4$
7670 PRINT USING FLOW1,LABEL$(9);
7680 FLOW1:FMT COL(2),CH(25),XX(2)
7690 FLOW2:FMT COL(28),PIC(#####)
7700 FOR Q = 1 TO 19
7710 PRINT USING FLOW2, ROUND(INVT(9,Q),0);
7720 NEXT Q
7730 PRINT USING FLOW2,ROUND(INVT(9,20),0)
7740 PRINT TAB(1),X4$
7750 PRINT SKIP(2),X5$
7760 SELECT CRT
7770 RETURN
```

'DEFPRIN' SUBROUTINES

```
7790 ********************************************************************
7800 *                                                                  *
7810 *      #43 - THIS SUBROUTINE PRINTS A COPY OF THE SELECTED         *
7820 *            INVENTORY ENTRIES FROM THE DISPLAY SECTION.           *
7830 *                                                                  *
7840 ********************************************************************
7850 DEFFN' 43(Y$)
7860 SELECT PRINTER
7870 IF N$ = HEX(00) THEN JMP5051
7880 PRINT PAGE
7890 PRINT X5$
7900 JMP5051:N$ = N$ XOR HEX(FF)
7910 PRINT SKIP(4),COL(53);"INVENTORY DISPLAY"
7920 PRINT SKIP(1);COL(31);"SELECT FOUR YEARS FOR OUTPUT BETWEEN 1 AND
7930  30"
7940 PRINT SKIP(2)
7950 PRINT USING SHP4,"FIRST YEAR";T15(1)
7960 SHP4:FMT COL(36),CH(14);COL(51);PIC(##)
7970 PRINT SKIP(1)
7980 PRINT USING SHP4,"SECOND YEAR";T15(2)
7990 PRINT SKIP(1)
8000 PRINT USING SHP4,"THIRD YEAR";T15(3)
8010 PRINT SKIP(1)
8020 PRINT USING SHP4,"FOURTH YEAR";T15(4)
8030 PRINT SKIP(2);X5$
8040 SELECT CRT
8050 RETURN
```

'DEFPRIN' SUBROUTINES

```
8070 ***************************************************************
8080 *                                                             *
8090 *     #44 - THIS SUBROUTINE PRINTS THE SELECTED INVENTORY     *
8100 *           IDENTIFIED IN #43.                                *
8110 *                                                             *
8120 ***************************************************************
8130 DEFFN' 44(Y$)
8140 SELECT PRINTER
8150 FOR P = 1 TO 9
8160 INIT(HEX(20))P1$(P)
8170 STR(P1$(P),1,24) = LABEL$(P)
8180 FOR R = 1 TO 4
8190 CONVERT INVT(P,T15(R)) TO STR(P1$(P),18+9*R,6),PIC(### ##)
8200 NEXT R
8210 NEXT P
8220 IF N$ = HEX(00) THEN JMP5052
8230 PRINT PAGE
8240 PRINT X5$
8250 JMP5052:N$ = N$ XOR HEX(FF)
8260 PRINT SKIP(2),TAB(53),"INVENTORY DISPLAY"
8270 PRINT SKIP(3),TAB(59),"YEARS"
8280 PRINT USING SHP5,"ACTIVITY",T15(1),T15(2),T15(3),T15(4)
8290 SHP5:FMT COL(37),CH(10),COL(59),PIC(##),COL(68),PIC(##),COL(77), !
8300 PIC(##),COL(86),PIC(##)
8310 PRINT SKIP(1),TAB(29),P1$(1)
8320 PRINT TAB(29),P1$(2)
8330 PRINT TAB(29),P1$(3)
8340 PRINT TAB(29),P1$(4)
8350 PRINT TAB(29),P1$(5)
8360 PRINT TAB(29),P1$(6)
8370 PRINT TAB(29),P1$(7)
8380 PRINT TAB(29),P1$(8)
8390 PRINT SKIP(1),TAB(26),"******************************************** !
8400 ****************************"
8410 PRINT SKIP(1),TAB(29),P1$(9)
8420 PRINT SKIP(1),TAB(26),"******************************************** !
8430 ****************************"
8440 PRINT SKIP(2),X5$
8450 SELECT CRT
8460 RETURN
```

'DEFPRIN' SUBROUTINES

```
8480 **************************************************************
8490 *                                                            *
8500 *     #45 - THIS SUBROUTINE PRINTS THE REQUIREMENTS          *
8510 *           MATRIX SHOWING THE REQUIREMENTS REMAINING        *
8520 *           TO BE FILLED.                                    *
8530 *                                                            *
8540 **************************************************************
8550 DEFFN' 45(Y$)
8560 SELECT PRINTER
8570 FOR P = 1 TO 7
8580 INIT(HEX(20))P1$(P)
8590 STR(P1$(P),1,24) = LABEL$(P)
8600 FOR R = 1 TO 4
8610 CONVERT DO(P,R) TO STR(P1$(P),18+9*R,7),PIC(#### ##)
8620 NEXT R
8630 NEXT P
8640 INIT(HEX(20))P1$(8)
8650 STR(P1$(8),1,24) = "LOWER GRADE FILLS"
8660 FOR R = 1 TO 3
8670 CONVERT Q37(8,R) TO STR(P1$(8),27+9*R,7),PIC(####.##)
8680 NEXT R
8690 IF N$ = HEX(00) THEN JMP5053
8700 PRINT PAGE
8710 PRINT X5$
8720 JMP5053:N$ = N$ XOR HEX(FF)
8730 PRINT SKIP(2),TAB(52),"REQUIREMENTS DISPLAY"
8740 PRINT SKIP(3),TAB(57),"CATEGORY"
8750 PRINT TAB(37),"ACTIVITY             LT      LCDR     CDR      CD
8760 R+"
8770 PRINT SKIP(1),TAB(29),P1$(1)
8780 PRINT TAB(29),P1$(2)
8790 PRINT TAB(29),P1$(3)
8800 PRINT TAB(29),P1$(4)
8810 PRINT TAB(29),P1$(5)
8820 PRINT TAB(29),P1$(6)
8830 PRINT TAB(29),P1$(7)
8840 PRINT SKIP(1),TAB(26),"*******************************************
8850 ****************************"
8860 PRINT SKIP(1),TAB(29),P1$(8)
8870 PRINT SKIP(1),TAB(26),"*******************************************
8880 ****************************"
8890 PRINT SKIP(2),X5$
8900 SELECT CRT
8910 RETURN
```

```
8930 **************************************************************
8940 *                                                            *
8950 *     #46 - THIS SUBROUTINE PRINTS THE VALUES IN THE         *
8960 *           ELAPSED TIME MATRIX Q7().                        *
8970 *                                                            *
8980 **************************************************************
8990 DEFFN' 46(Y$)
9000 SELECT PRINTER
9010 FOR P = 1 TO 7
9020 INIT(HEX(20))P1$(P)
9030 STR(P1$(P),1,24) = LABEL$(P)
9040 FOR R = 1 TO 7
9050 CONVERT ROUND(Q7(P,R),0) TO STR(P1$(P),21+5*R,3),PIC(###)
9060 NEXT R
9070 NEXT P
9080 STR(P1$(8),1,24) = "NON-AVIATION MAN YEARS"
9090 FOR R = 1 TO 7
9100 CONVERT ROUND(OUTA(R),0) TO STR(P1$(8),21+5*R,3),PIC(###)
9110 NEXT R
9120 IF N$ = HEX(00) THEN JMP5054
9130 PRINT PAGE
9140 PRINT X5$
9150 JMP5054:N$ = N$ XOR HEX(FF)
9160 PRINT SKIP(2),TAB(43),"ELAPSED TIME (Q7) DISPLAY"
9170 PRINT SKIP(3),TAB(72),"TOUR"
9180 PRINT TAB(37),"ACTIVITY            1    2    3    4    5    6
9190 7"
9200 PRINT SKIP(1),TAB(29),P1$(1)
9210 PRINT TAB(29),P1$(2)
9220 PRINT TAB(29),P1$(3)
9230 PRINT TAB(29),P1$(4)
9240 PRINT TAB(29),P1$(5)
9250 PRINT TAB(29),P1$(6)
9260 PRINT TAB(29),P1$(7)
9270 PRINT SKIP(1),TAB(26),"*******************************************
9280 ****************************"
9290 PRINT SKIP(1),TAB(29),P1$(8)
9300 PRINT SKIP(1),TAB(26),"*******************************************
9310 ****************************"
9320 PRINT SKIP(2),X5$
9330 SELECT CRT
9340 RETURN
```

'DEFPRIN' SUBROUTINES

```
9360 ***************************************************************
9370 *                                                             *
9380 *     #47 - THIS SUBROUTINE PRINTS A COMPLETE SET OF          *
9390 *           PRINTS AS SPECIFIED IN #41-#46.  THE RESULT       *
9400 *           ARE LISTED IDENTICALLY TO THE INDIVIDUAL          *
9410 *           PRINTS AT TWO DISPLAYS PER PAGE.                  *
9420 *                                                             *
9430 ***************************************************************
9440 DEFFN' 47(Y$)
9450 Y2 = 1
9460 GOSUB' 41(Y$)
9470 GOSUB' 42(Y$)
9480 GOSUB' 45(Y$)
9490 GOSUB' 46(Y$)
9500 Y2 = 0
9510 RETURN
```

```
Basic Cross Reference

String Variable   A$ 22
(Common)             100    410   2800   3780   3780   3730   4000   4000   4010   4020   4080   4110   4140   4560   4730   4900
                    5870   5910   5920   6250   6260   6620

Float Array       A1(15,9)
(Common)             130   4150

Float Variable    ACC1
(Common)             140   4150   4160   4870   4880

String Variable   B$ 70
(Common)             120    290   3700   3710   3760   7420   7440   7450   7500

String Variable   BGROUP$ 16
(Static)            5830   6460   6590

String Variable   C$ 70
(Common)             120

String Variable   D$ 8
(Common)             110    190    200    210    220    230    470   2350   3780   3790   5850   6880

Float Array       D0(7,4)
(Common)             100    350   1630   8010

Float Variable    D10
(Static)            6830   6990

Float Variable    D3
(Static)            2250   2730   2750   2770   2870   3080   3680   4280   4290   4290   4520   5240   5420   5420

Float Array       D8(8)
(Common)             110    370    370   4640   4640   4640   4650   4660   4660   4700

Float Array       D9(4)
(Common)             110    330    350    350    370    370    500    520    540    560   6320   6930   6940   6950

String Variable   DES$ 30
(Static)             160   4120   4130   4120

String Variable   E$ 130
(Common)             130

String Variable   F$ 70
(Static)             160   3990   4000   4010   4030

Label             FLOW1
                    7670   7680
```

```
Basic Cross-Reference

Label              FLOW10
                     7580    7640

Label              FLOW2
                     7690    7710    7730

Label              FLOW20
                     7600    7620    7650

String Variable    GRA$ 16
(Static)             4730    4740    4750    4760

Float Variable     I
(Static)             5280    5290    5300    5320

Float Array        I4(7,7)
(Common)              110     800    4830    5370    7230

Float Array        INVT(9,31)
(Common)              100     590    1330    2290    2310    2350    2370    2410    2430    2470    2490    2530    2560    2580    2630    2660
                     2680    2840    3280    3290    3320    3330    3360    3370    3400    3410    3500    3510    3540    3550    3580    3590
                     3620    3630    4150    4720    4880    5380    6810    7600    7620    7710    7730    8190

Float Variable     J
(Static)             5230    5260    5270    5290    5300    5360    5370

Float Variable     J1
(Static)             4140    4140    4150

Label              JMP1406
                     4700    4720

Label              JMP1407
                      300    2250

Label              JMP1408
                     4670    4810

Label              JMP1409
                      310    5120

Label              JMP1410
                     4900    4970

Label              JMP1411
                     4960    5020

Label              JMP1412
                     2850    3230
```

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```
Basic Cross-Reference

Label                JMP1420
                      3830   3890

Label                JMP1421
                      3880   4050

Label                JMP402
                      700     760

Label                JMP403
                      700    1100

Label                JMP404
                      700    1580

Label                JMP405
                      700    1910

Label                JMP501
                      390     710     730     750    1070    1090    1240    1270    1550    1570    1880    1900    2200    2220

Label                JMP502
                      1240   1250    1280

Label                JMP5050
                      7160   7190

Label                JMP5051
                      7870   7900

Label                JMP5052
                      8220   8250

Label                JMP5053
                      8690   8720

Label                JMP5054
                      9120   9150

Label                JMP5057
                      7460   7490

Label                JMP5100
                      700     740

Label                JMP5101
                      700     720

Label                JMP5102
                      1070   1080
```

```
Basic Cross-Reference

Label               JMP5103
                       1240    1260

Label               JMP5104
                       1550    1560

Label               JMP5105
                       1880    1890

Label               JMP5106
                       2200    2210

Label               JMP5801
                       5890    5920    6670

Label               JMP5806
                       6330    6380

Label               JMP5808
                       6470    6540

Label               JMP5809
                       6480    6530

Label               JMP5810
                       6590    6620

Label               JMP5811
                       6550    6570

Label               JMP8101
                       5290    5320

Label               JMP8102
                       5260    5330

Label               JMP8103
                       5350    5430

Float Variable      K
(Static)               6440    6480    6490    6550

Float Variable      K1
(Static)               5870    5910    6020    6080    6620

Float Variable      K2
(Static)               5870    5910    6140    6150    6620

Float Variable      L
```

```
Basic Cross-Reference

(Static)           6260  6260  6280  6290  6300  6330  6430  6430  6460  6460  6570

String Array       LABEL$(9) 25
(Common)             100   890   910   930   950   970   990  1010  1310  1610  1940  4370  4420  5980  6040  7360
                    7580  7670  8170  8590  9030

Float Variable     MG
(Static)             680   690   700

String Variable    MGROUP$ 30
(Common)             140  5890  6460  6530

Float Variable     N
(Static)            5250  5260  5270  5270  5290  5300  5310  5310  5330  5340  5350  5360  5370  5370  5370  5370
                    5420  5430

String Variable    N$ 16
(Static)            6820  7040  7040  7160  7190  7190  7460  7490  7490  7870  7900  7900  8220  8250  8250  8690
                    8720  8720  9120  9150  9150

Float Array        OUTA(8)
(Common)             130  2010  9100

Float Variable     P
(Static)             340   350   360   770   780   800   800   820  1290  1300  1310  1310  1330  1330  1350  1590
                    1600  1610  1610  1630  1630  1650  1930  1930  1940  1940  1960  1960  1980  2280  2290  2300
                    2340  2350  2360  2400  2410  2420  2460  2470  2480  2520  2530  2540  2550  2560  2570  2620
                    2630  2640  2650  2660  2670  2780  2790  2790  2800  2810  2820  2820  2830  3260  3280  3280
                    3280  3290  3290  3290  3320  3320  3320  3330  3330  3330  3360  3360  3360  3370  3370  3370
                    3400  3400  3400  3410  3410  3410  3430  3440  3460  3460  3480  3650  3660  3660  3670  4360
                    4370  4370  4390  4390  4410  4460  4470  4480  4480  4490  4490  4500  4530  4540  4550  4580
                    4590  4590  4600  4600  4600  4610  4630  4700  4700  4710  4730  4740  4750  4810  4830  4850
                    4910  4920  4920  4930  4930  4930  4940  4950  4970  4980  4980  4990  4990  4990  5000  5010
                    5330  5400  5410  5550  5570  5570  5580  5580  5590  5590  5590  5600  5600  5600  5620  5640
                    5650  5660  5670  5690  5700  5700  5710  5710  5720  5730  5740  5750  5760  5760  5770  5770
                    5780  5790  5800  5880  5890  5890  5900  5970  5980  6000  6020  6030  6270  6280  6290  6300
                    6310  6320  6450  6460  6460  6510  6540  6580  6590  6590  6600  7000  7010  7030  7230  7250
                    7350  7360  7360  7370 [illegible] 7580  7600  7620  7630  8150  8160  8170  8170  8190  8190  8210
                    8570  8580  8590  8590  8610  8610  8630  9010  9020  9030  9030  9050  9050  9070

Float Array        PO(10)
(Common)             110  3860  3950

String Array       F1$(9) 130
(Common)             120   390   400   410   420   430   440   450   790   800   900   930   940   960   980  1000
                    1020  1300  1310  1330  1410  1420  1430  1440  1450  1460  1470  1480  1510  1600  1610  1630
                    1660  1670  1690  1750  1760  1770  1790  1790  1800  1810 [illegible] [illegible] 1940  1960  1990  2030
                    2070  2080  2090  2100  2110  2120  2130  2160 [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]  4350  4370
                    4390  4410  4440  4470  4480  4490  4510  4520 [illegible] [illegible] [illegible] [illegible]  4760  4770  4780  5020
                    5030  5040  5070  6870  7210  7230  7300 [illegible] [illegible] [illegible] [illegible] [illegible]  8330  8340  8350  8360
```

```
Basic Cross-Reference

                    8370  8380  8410  8580  8590  8610  8640  8650  8670  8770  8780  8790  8800  8810  8820  8830
                    8860  9020  9030  9050  9080  9100  9200  9210  9220  9230  9240  9250  9260  9290

Float Variable     P5
(Common)             100   410   420   430   440  2890  2900  2910  2920  6840

Float Variable     P6
(Common)             100   430   440  2910  2920  6840

Float Variable     P9
(Common)             120   450  2890  2900  2910  2920  6840  6870

Float Variable     PR
(Static)            3220  3230

Float Variable     PR04
(Common)             140  2270  2330  3270  3310  3430  3530

Float Variable     PR05
(Common)             140  2330  2390  2390  2450  3310  3350  3350  3390  3530  3570  3570  3610

Float Array        PTR(14)
(Common)             150  5700  5700  5710  5710  5720  5730  5760  5760  5770  5770  5780  5790  6290  6300  6350
                    6360

Float Variable     Q
(Static)             320   330   350   350   350   370   370   370   370   380  2270  2290  2310  2320  2330  2350
                    2370  2380  2390  2410  2430  2440  2450  2470  2490  2500  2510  2530  2560  2580  2590  2610
                    2630  2660  2680  2690  3270  3280  3290  3300  3310  3320  3330  3340  3350  3360  3370  3380
                    3390  3400  3410  3420  3450  3460  3460  3470  3490  3500  3510  3520  3530  3540  3550  3560
                    3570  3580  3590  3600  3610  3620  3630  3640  3680  3690  3700  3710  4380  4390  4390  4400
                    4430  4440  4440  4450  4820  4830  4840  5560  5570  5570  5580  5580  5590  5600  5610  5630
                    5650  5650  5650  5660  5660  5660  5680  5990  6000  6010  6050  6060  6070  6130  6140  6150
                    6160  7590  7600  7610  7700  7710  7720

Float Variable     Q11
(Common)             100   430  2910  3690  3700  3830  3900  3930  3960  4030  4150  7440  7440  7450

Float Array        Q37(8,4)
(Common)             130  1690  4590  4600  4620  4620  4620  4640  4640  4640  4650  4660  4660  4700  8670

Float Array        Q7(7,7)
(Common)             120  1960  5360  9050

Float Variable     Q74
(Common)             150  4860

Float Array        Q75(5)
(Common)             150  4930  4930  4940  4940  5870
```

```
Basic Cross-Reference

Float Variable     Q76
(Common)              150   4890

Float Array        Q77(5)
(Static)              170   4560   4560   4600   4600   4790   4790   5870   5910   6200   6630

Float Variable     Q78
(Static)             4630   4640   4650   4660   4660   4670   4700   4770

Float Array        Q79(5)
(Common)              150   4990   4990   5000   5000   5910   6630

Float Array        Q85(5)
(Common)              150   4560   4790

Float Array        Q89(5)
(Common)              150   4560   4790

Float Array        Q9(7,7)
(Static)              160   3240   3280   3280   3290   3290   3320   3320   3330   3330   3360   3360   3370   3370   3400   3400
                     3410   3410   3460   3460   4790

Float Variable     R
(Static)              790    800    800    810   1320   1330   1330   1340   1620   1630   1630   1640   1680   1690   1690   1700
                     1950   1960   1960   1970   2000   2010   2010   2020   3620   3700   3710   7220   7230   7230   7240   8180
                     8190   8190   8200   8600   8610   8610   8620   8660   8670   8670   8680   9040   9050   9050   9060   9090
                     9100   9100   9110

Float Array        R0(30)
(Common)              130   5400

Float Variable     R02
(Common)              110   3840   3890

Float Variable     S
(Static)             4020   4020   4030

Float Array        S1(15,5)
(Common)              110   3830   3900   3930   3960   4030

Label              SHP1
                     6920   6930   6940   6950   6960

Label              SHP10
                     6880   6890

Label              SHP2
                     6990   7000   7010

Label              SHP20
```

```
Basic Cross-Reference

                      3840   3890   3910

Label                 SHP3
                      7340   7360

Label                 SHP30
                      3850   3930   3940

Label                 SHP31
                      3860   3950   3970

Label                 SHP33
                      4160   4170   4260

Label                 SHP34
                      4190   4200   4280

Label                 SHP35
                      4220   4240

Label                 SHP4
                      7950   7960   7980   8000   8020

Label                 SHP5
                      8280   8290

Label                 SHP51
                      3870   4030   4040

Label                 SHP5R01
                      5980   6040   6280   6340   6680

Label                 SHP5R02
                      6000   6060   6150   6630

Label                 SHP5R03
                      6020   6080   6170   6200   6700

Label                 SHP5R04
                      6290   6350   6400   6710

Label                 SHP5R05
                      6300   6360   6410   6720

Label                 SHP9
                      7230   7310

String Variable       T$ 5
(Common)               100    240    250    260    470   2950   3800   5860   6200
```

```
Basic Cross Reference

Float Variable   T1
(Static)            5360   5390

Float Variable   T11
(Common)            110    610   2840   7000

Float Array      T15(20)
(Common)            120   1130   1150   1170   1190   1190   1380   [illegible]   1400   1400   7950   7980   8000   8020   8130   8280
                   8280   8280   8280

Float Array      T5(20)
(Common)            110   2260   2530   2530   2560   2560   2580   2580   2600   2600   2600   2630   2630   2660   2660   2680
                   2680   2700   2700   2700   2710   2710   2710   3450   3500   3500   3510   3510   3540   3540   3550   3550
                   3580   3580   3590   3590   3620   3650   3670   3680   3680   3680   4390   4440   4620   4830   4830   4860
                   4860   4870   4880   4890   4920   4930   4930   4940   4980   4980   4990   5000   5040   5040   5040   5040

Float Array      T6(20)
(Static)            160   5240   5270   5370   5370   5420   5440   5450   5650   5660   5660   5720   5720   5730   5730   5780
                   5780   5790   5790   6140   6150   6370   6370   6370   6370   6400   6410

Float Array      T7(20)
(Static)            160   5240   5300   5310   5310   5310   5350   5370   5380   5400   5400   5420   5540   5590   5590   5600
                   5600   6020   6080   6120   6140   6140   6170

Float Array      T8(20)
(Common)            110   2260   2290   2290   2310   2310   2350   2350   2370   2370   2410   2410   2430   2430   2470   2470
                   2490   2490   2600   2700   2710   2730   2750   2750   2770   2790   2790   2820   2820   2870   2870   2870
                   2870   2990   3010   3030   3040   3050   3070   3140   3150   3180   3620   3680   3680   3680   4160   4190
                   4190   4220   4230   4260   4430

String Array     T9$(7,7) 26
(Common)            130   5260   5270   5290   5300

Float Array      TC0(7,5)
(Common)            120   4150

String Variable  TDES$ 30
(Static)            160   4090   4100   4160

Float Array      TDT(8,3)
(Common)            140   5870   5910   6000   6060   6620

Float Array      TDTA(8,3)
(Common)            140   5570   5570   5590   5650   5870

Float Array      TDTN(8,3)
(Common)            140   5580   5580   5600   5660   5910   6620

String Array     TRA$(7) 25
(Common)            150   6280   6340
```

```
Basic Cross-Reference

String Array       TYPE$(14) 30
(Common)              100     430    2910    3090    3700    6530    7440    7440    7450

String Variable    X$ 70
(Common)              140    2940

String Variable    X4$ 130
(Common)              120     270    4680    4800    7560    7660    7740

Float Variable     X45
(Static)             2840    3130

Float Variable     X46
(Static)             2840    3170    4260

String Variable    X5$ 130
(Common)              120     280    3810    4050    4300    5060    5080    5330    6180    6210    6420    6560    6860    7020    7180    7400
                     7480    7750    7890    8030    8240    8440    8710    8820    9140    9320

String Variable    Y$ 130
(Parameter)            10     160     460     720     740    1080    1260    1560    1890    2210    3770    5030    6570    6800    6880    7140
                     7850    8130    8550    8990    9440    9460    9470    9480    9490

Float Variable     Y1
(Parameter)            10     300     310

Float Variable     Y2
(Static)             7430    9450    9500

String Variable    Z1$ 3
(Common)              130    3200

String Variable    Z4$ 3
(Common)              130    2850    3770
```

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APPENDIX C

DEFAULT VALUES FOR MODEL VARIABLES

This appendix provides tabulations of all parameters of the Aviation Officer Requirements Model as they exist in the computer data base when the program is first called up. These are the default values to which the model is initially set. The operator can change any or all of these values for a particular run.

TABLE C1

GRADE STRUCTURE FLEET SQUADRONS AND FLEET READINESS SQUADRON
(Grade Matrix G0)

Subcommunity	FLEET SQUADRON						FLEET READINESS SQUADRON					
	Aviators			NFOs			Aviators			NFOs		
	05	04	03	05	04	03	05	04	03	05	04	03
Light Attack	2	4	11	0	0	0	8	23	85	0	0	0
Fighter	1	2	11	1	2	11	8	23	137	4	15	77
Medium Attack	1	2	13	1	2	13	2	5	44	2	6	31
Early Warning	1	2	7	1	2	12	2	6	34	2	5	33
Electronic Warfare	1	2	3	1	3	14	1	3	38	1	3	26
Carrier ASW	1	3	16	1	3	15	1	8	47	1	5	24
Helicopter ASW	2	4	14	0	0	0	4	17	57	0	0	0
Maritime Patrol	1	3	34	1	3	19	2	15	76	2	9	53
LAMPS MK I	2	4	14	0	0	0	4	17	51	0	0	0
LAMPS MK III	2	17	41	0	0	0	2	13	39	0	0	0
Electronic Warfare	0	0	0	0	0	0	0	0	0	0	0	0
Force Support Jet	0	0	0	0	0	0	0	0	0	0	0	0
Force Support Prop	0	0	0	0	0	0	0	0	0	0	0	0
Force Support Helo	1	3	1	0	0	0	0	0	0	0	0	0
Air Wing Staff	1	3	1	0	0	0	0	0	0	0	0	0

TABLE C2

SQUADRON STRUCTURE
(Squadron Matrix S1)

Subcommunity	Number of Squadrons	Aircraft Per Squadron	Crew Factor	Pilots Per Crew	NFOs Per Crew
Light Attack	24	12	1.42	1	0
Fighter	24	12	1.17	1	1
Medium Attack	12	14	1.14	1	1
Early Warning	12	3	1.66	2	3
Electronic Warfare	9	4	1.5	1	3
Carrier ASW	11	9	1.44	1.5	1.5
Helicopter ASW	11	6	1.66	2	0
Maritime Patrol	24	9	1.33	3	2
LAMPS MK I	6	11	2	2	0
LAMPS MK II	8	15	2	2	0
Electronic Warfare	0	0	0	0	0
Force Support Jet	0	0	0	0	0
Force Support Prop	0	0	0	0	0
Force Support Helo	0	0	0	0	0
Air Wing Staff	12	0	0	0	0

TABLE C3

PIPELINE IDENTIFICATION
Allocation Parameters
(Allocation Matrix-A1)

Subcommunity	Group Identifier			Pilots			NFOs		
	Pilot Pipe	NFO Pipe	Fraction of All Pilots	Fraction of Community Pilots	Fraction of Carrier Pilots	Fraction of All NFOs	Fraction of Community NFOs	Fraction of Carrier NFOs	Fraction of All Aviation Officers
Light Attack	A	O	.1068	.2617	.2690	0	0	0	.0729
Fighter	A	D	.0838	.2053	.2110	.1797	1.0	.3101	.1142
Medium Attack	A	E	.0475	.1163	.1195	.1011	.3536	.1744	.0645
Early Warning	B	F	.0311	.0762	.0783	.0929	1.0	.1604	.0507
Electronic Warfare	A	E	.0197	.0483	.0496	.0965	.3375	.1665	.0441
Carrier ASW	A	E	.0508	.1245	.1279	.1092	1.0	.1885	.0694
Helicopter ASW	C	O	.0575	.1883	.1447	0	0	0	.0392
Maritime Patrol	B	G	.2210	.8737	0	.3047	.9170	0	.2476
LAMPS MK I	C	O	.0628	.2057	0	0	0	0	.0430
LAMPS MK III	C	O	.1141	.3741	0	0	0	0	.0780
Electronic Warfare	B	G	.0337	.0826	0	.0883	.3089	0	.0510
Force Support Jet	A	E	.1004	.0852	0	.0276	.0829	0	.0773
Force Support Prop	B	G	.1004	.1263	0	.0276	.0829	0	.0773
Force Support Helo	C	O	.0708	.2919	0	0	0	0	.0483
Air Wing Staff	O	O	.3972	0	1	.5794	0	1	.4550

Pipeline Key
- A. Jet Aviator
- B. Prop Aviator
- C. Helo Aviator
- D. RIO NFO
- E. TN NFO
- F. ATDS NFO
- G. NAV NFO

O. Not incl

TABLE C4

SUPPLEMENTAL FLEET REQUIREMENTS
Grade Table
(Auxilliary Matrix-Aux)

Subcommunity	Pilots			NFOs		
	05	04	03	05	04	03
Light Attack	0	12	18	0	0	0
Fighter	0	6	6	0	4	8
Medium Attack	0	4	0	0	2	0
Early Warning	2	2	2	0	2	0
Electronic Warfare	2	4	21	1	5	29
Carrier ASW	0	0	0	0	0	0
Helicopter ASW	2	10	4	0	0	0
Maritime Patrol	0	56	6	0	17	27
LAMPS MK I	0	6	0	0	0	0
LAMPS MK III	0	0	0	0	0	0
Electronic Warfare	4	20	117	3	12	140
Force Support Jet	25	96	247	6	10	47
Force Support Prop	2	10	38	2	4	23
Force Support Helo	16	25	276	0	0	0
Air Wing Staff	0	0	0	0	0	0

TABLE C5

TRAINING COMMAND REQUIREMENTS
(Training Command Matrix-TC0)

Pipeline	Input/Output Ratio	05	04	Instructor Planning Factors	
				Pilot	NFO
Jet Aviator	1.405	22	44	.860	0
Prop Aviator	1.291	7	14	.443	0
Helo Aviator	1.347	7	14	.542	0
RIO NFO	1.791	1	2	.180	.255
TN NFO	1.771	1	2	.118	.156
ATDS NFO	1.523	1	2	.070	.079
NAV NFO	1.426	1	2	.030	.088

TABLE C6

RDT&E AFLOAT AND OTHER REQUIREMENTS
(Matrix-OTH)

	AVIATORS				NAVAL FLIGHT OFFICERS			
Activity	Senior 05	05	04	03	Senior 05	05	04	03
RTD&E	26	26	120	189	5	6	31	75
AFLOAT	96	97	130	219	14	9	60	82
OTHER	289	28[illegible]	710	634	91	91	243	312

TABLE C-7A

NETWORK DESCRIPTION
ACTIVITY: FLEET SQUADRON TOURS

TOUR	TOUR LENGTH	PRECEDENT NODES						
		FLEET	FRS	TRACOM	RDT&E	ALFOAT	PRODEV	OTHER
1	36	OOO	NNN	NNN	NNN	NNN	NNN	NNN
2	36	NNN	NNN	OOO	NNN	NNN	NNN	NNN
3	36	NNN	OOO	OOO	OOO	NNN	OOO	OOO
4	36	NNN	OOO	OOO	OOO	OOO	OOO	OOO
5	36	NNN	OOO	OOO	OOO	OOO	OOO	OOO
6	24	OOO	OOO	OOO	OOO	OOO	OOO	OOO
7	12	OOO	OOO	OOO	OOO	OOO	OOO	OOO

NNN: PRECEDENT NODE IS BARRED

OOO: TRANSITION FROM PRECEDENT NODE IS PERMITTED

TABLE C-7B

NETWORK DESCRIPTION
ACTIVITY: FLEET READINESS SQUADRON

TOUR	TOUR LENGTH	PRECEDENT NODES						
		FLEET	FRS	TRACOM	RDT&E	ALFOAT	PRODEV	OTHER
1	00	NNN	NNN	NNN	NNN	NNN	NNN	NNN
2	36	000	NNN	NNN	NNN	NNN	NNN	NNN
3	36	000	NNN	NNN	NNN	NNN	NNN	NNN
4	36	000	NNN	NNN	NNN	NNN	NNN	NNN
5	36	000	NNN	NNN	NNN	NNN	NNN	NNN
6	24	000	NNN	NNN	000	000	000	000
7	24	000	NNN	NNN	NNN	NNN	NNN	NNN

NNN: PRECEDENT NODE IS BARRED

000: TRANSITION FROM PRECEDENT NODE IS PERMITTED

TABLE C-7C

NETWORK DESCRIPTION
ACTIVITY: TRAINING COMMAND

TOUR	TOUR LENGTH	PRECEDENT NODES						
		FLEET	FRS	TRACOM	RDT&E	ALFOAT	PRODEV	OTHER
1	24	OOO	NNN	NNN	NNN	NNN	NNN	NNN
2	36	OOO	NNN	NNN	NNN	NNN	NNN	NNN
3	36	NNN	NNN	NNN	NNN	NNN	OOO	OOO
4	36	OOO	NNN	NNN	NNN	OOO	OOO	OOO
5	36	OOO	NNN	NNN	NNN	OOO	OOO	OOO
6	24	OOO	OOO	OOO	OOO	OOO	OOO	OOO
7	36	NNN	NNN	OOO	OOO	OOO	OOO	OOO

NNN: PRECEDENT NODE IS BARRED

OOO: TRANSITION FROM PRECEDENT NODE IS BARRED

TABLE C-7D

NETWORK DESCRIPTION
ACTIVITY: RESEARCH AND DEVELOPMENT

TOUR	TOUR LENGTH	PRECEDENT NODES						
		FLEET	FRS	TRACOM	RDT&E	ALFOAT	PRODEV	OTHER
1	00	NNN	NNN	NNN	NNN	NNN	NNN	NNN
2	36	000	NNN	NNN	NNN	NNN	NNN	NNN
3	36	000	000	000	NNN	NNN	000	NNN
4	36	000	000	NNN	NNN	000	000	000
5	36	000	000	000	NNN	000	000	000
6	36	000	000	000	NNN	000	000	000
7	36	000	000	000	NNN	000	000	000

NNN: PRECEDENT NODE IS BARRED

000: TRANSITION FROM PRECEDENT NODE IS PERMITTED

TABLE C-7E

NETWORK DESCRIPTION
ACTIVITY: AFLOAT ASSIGNMENTS

TOUR	TOUR LENGTH	PRECEDENT NODES						
		FLEET	FRS	TRACOM	RDT&E	ALFOAT	PRODEV	OTHER
1	00	NNN	NNN	NNN	NNN	NNN	NNN	NNN
2	00	NNN	NNN	NNN	NNN	NNN	NNN	NNN
3	24	NNN	000	000	000	NNN	000	000
4	24	NNN	000	000	000	NNN	000	000
5	24	NNN	000	000	000	NNN	000	000
6	24	NNN	000	000	000	NNN	000	000
7	24	000	000	000	000	NNN	000	000

NNN: PRECEDENT NODE IS BARRED

000: TRANSITION FROM PRECEDENT NODE IS PERMITTED

TABLE C-7F

NETWORK DESCRIPTION
ACTIVITY: PROFESSIONAL DEVELOPMENT

TOUR	TOUR LENGTH	PRECEDENT NODES						
		FLEET	FRS	TRACOM	RDT&E	ALFOAT	PRODEV	OTHER
1	00	NNN	NNN	NNN	NNN	NNN	NNN	NNN
2	24	OOO	NNN	NNN	NNN	NNN	NNN	NNN
3	24	OOO	OOO	OOO	OOO	NNN	NNN	OOO
4	24	OOO	OOO	NNN	OOO	OOO	NNN	OOO
5	12	OOO	OOO	OOO	OOO	OOO	NNN	OOO
6	12	OOO	OOO	OOO	OOO	OOO	NNN	OOO
7	12	OOO	OOO	OOO	OOO	OOO	NNN	OOO

NNN: PRECEDENT NODE IS BARRED

OOO: TRANSITION FROM PRECEDENT NODE IS PERMITTED

TABLE C-7G

NETWORK DESCRIPTION
ACTIVITY: OTHER

TOUR	TOUR LENGTH	PRECEDENT NODES						
		FLEET	FRS	TRACOM	RDT&E	ALFOAT	PRODEV	OTHER
1	00	NNN	NNN	NNN	NNN	NNN	NNN	NNN
2	36	000	NNN	NNN	NNN	NNN	NNN	NNN
3	36	000	000	000	000	NNN	NNN	NNN
4	36	000	000	000	NNN	NNN	NNN	NNN
5	36	000	000	000	NNN	NNN	000	NNN
6	36	000	000	000	000	000	000	NNN
7	36	000	000	000	000	000	000	NNN

NNN: PRECEDENT NODE IS BARRED

000: TRANSITION FROM PRECEDENT NODE IS PERMITTED

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